Jörg Roche, Ferran Suñer

Language Learning and Cognition

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Prof. Dr. Jörg Roche
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The Basics of Cognitive Language Pedagogy

With Contributions by
Kees de Bot, Marina Foschi, Marianne Hepp,
Sabine De Knop and Parvaneh Sohrabi

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Contact:
Fresnostr. 2 D-48159 Münster
Tel. +49 (0) 2 51-62 03 20 Fax +49 (0) 2 51-23 19 72
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Foreword

Despite many advances in Second/Foreign Language Acquisition Research and Language Pedagogy language teaching remains a field governed largely by traditional methods, e.g., with respect to the prevalence of grammar progression, error correction, instructional methodology, and focus on forms. Models of language, too, are often outdated as they focus largely on abstract structural features. Cognitive linguistics offers a comprehensive approach to modernizing language teaching in many ways. We are witnessing a paradigm shift rarely seen in language instruction. This volume highlights those aspects of the cognitive paradigm that are most relevant for language learning and teaching. Each chapter generally comprises of three learning units which present the most relevant theories, models and findings in a systematic fashion and combines them with additional readings, tasks, resources and materials in order to prepare and accompany a transfer into teaching practice.

Both Volume 2 *Cognitive Linguistics* and the present volume aim at professionalizing the field of language teaching by providing the reader with insights into the most modern research in the fields of linguistics, language acquisition research, media studies, cultural studies, and language pedagogy while building on the readers' experience as language learner/user or teacher and enabling the reader to use the newly acquired competence in his or her own teaching. Also, the reader is familiarized with modern research methods and resources. The book is suited for undergraduate and graduate students in linguistics, language acquisition and teaching as well as related fields and serves as an excellent overview to all practicing and future language instructors.

This volume has been translated and adapted from German (*Kompendium DAF/DAZ: Sprachenlernen und Kognition* (Gunter Narr Verlag Tübingen)). The translation was carefully reworked by Matthias Roche and edited by Jörg Roche. Andrea DeCapua provided helpful feedback on several chapters of the book. Several authors contributed to the volume. While predominantly compiled by Jörg Roche and Ferran Suñer, parts of the text consist of reworked excerpts taken from Jörg Roche's publication *Mehrsprachigkeitstheorie* (2013) (1.1, Chapters 2, 4, 7 and 8), as well as from *Hypertexte im L2-Spracherwerb* (2011) by Ferran Suñer (4.1, 4.3, 5.1, 5.3, 6.2, 6.4) and from the collaborative article *Kognition und Grammatik: Ein kognitionswissenschaftlicher Ansatz zur Grammatikvermittlung am*

Beispiel der Grammatikanimationen (2014) which appeared in *Zeitschrift für den Interkulturellen Fremdsprachenunterricht* (*Journal for Intercultural Foreign Language Teaching*) (1.1, 2.1, 2.3, Chapter 7). Parts of chapter 2.3 are based on Ferran Suñer's article *Metaphern und Grammatikvermittlung am Beispiel der Passivkonstruktion* (2015), additional parts of chapter 2.3 on the article *Metaphors and Grammar Teaching* (2016) by Jörg Roche & Ferran Suñer. Other chapters were compiled by Kees de Bot (1.2), Sabine De Knop (Chapter 3), Marianne Hepp & Marina Foschi (5.2), and Parvaneh Sohrabi (6.4).

A dynamic online dictionary in German accompanies the book (www.lexikon-mla.de). Furthermore, several online modules in German accompany and supplement the book (https://multilingua-akademie.de/). The modules contain presentations/talks by renown scholars (in English and German), animations, web-ressources, URLs, experiments, and tasks. The complete set of online modules of the Kompendium series – or individual chapters thereof – can be booked as tutored ECTS-courses and may be applied towards academic programmes on the MA level or used for professional development purposes.

The production of the contents and online-modules was made possible by a grant from the EU Tempus programme to the *Consortium for Modern Language Teacher Education* (COMOLTE).

Introduction

Intercultural Communication in the Age of Globalization

Communication between different cultures is one of the most important social, political, and economic tasks in our increasingly globalized world. Globalization takes place on different levels: locally within multicultural or increasingly multicultural societies, regionally in multinational institutions, and internationally in transcontinental groups, world organizations (for economy, health, education, sport, and banking among others), and in cyberspace. At the same time, all of these globalization efforts are part of a growing paradox. The necessity of solving the great social and economic problems that arise from the global interconnection of various actors and processes stands in opposition to reactionary endeavors that wish to take precautions against a loss of cultural identity. On the one hand, the reduction of real and relative distances forces a transgression of the boundaries of cohabitation and communication between people of different origins in an unprecedented intensity. On the other hand, the ideal of the multicultural society is faced with the same obstacles. Many thought that the creation of such a society would overcome such opposition. Multicultural societies that are held together by force, often with great military efforts, cannot endure without forced pressure. A consequence of these types of societies is that they generate extreme cultural tensions. Even democratically created multicultural societies require much time and energy to move onwards from the phase of multicultural toleration toward intercultural tolerance and intercultural togetherness. The right-wing populist movements in Europe and the Americas and the ethnic conflicts in Africa and Asia show how our societies are at a boiling point beneath surface-level societal tolerance and postulates of internationalization. Ethnocentrism, xenophobia, right-wing populism, racism, discrimination, terrorism, civil war, mass murder, and genocide have not disappeared when multiculturalism is governed by politics and economics. The widespread failure of multiculturalism models shows that a decreed and forced cohabitation of cultures without any mediation efforts exacerbates tensions instead of ensuring sustainable tolerance. There is a lack of efficient mediation procedures between cultures. For this reason, languages occupy an important position: they are an important instrument for communication across cultural boundaries and ensure the sustainability of that communication. Though language cannot solve all problems, it bears a key role in establishing intercultural exchange

which transcends merely mastering the structures of language systems. This function of language concerns itself more with cultural mediation than with the structural traits of a language system. Establishing and maintaining intercultural communication is a function which a single lingua franca can hardly fulfil on its own. In reality, the learning and teaching of languages is the most important political tool in the age of globalization and internationalization. Teachers and students, however, often treat language classes and the learning of languages as a domain of mere grammar acquisition rather than a way of accessing other cultures. Learning and communication potentials are neglected when cultural aspects of foreign language acquisition are reduced to the learning of facts and the structural aspects of language are emphasized more than its content, leaving cultural aspects underdeveloped. More seriously, a focus on structures and forms severely limits the acquisition of semantic, pragmatic, and semiotic competences which are essential to intercultural communication. Intercultural competences are in high demand. Not only language classes but also language acquisition in the broader sense should, therefore, take cultural aspects of languages and communication into account. This requires a greater awareness of the cultural underpinnings of languages and the linguistic underpinnings of cultures. These interrelations need to manifest in teaching and learning practices that are sensitive to culture and aim to utilize the available natural resources of multilingualism and multiculturalism organically, dynamically, and efficiently instead of reconstructing multilingualism artificially and attempting to archive it. Future research on teaching and learning should focus more on the aspects of the ecology and economy of the acquisition of language(s) as well as their management. However, this new focus also means that language acquisition and multilingualism research can no longer be merely eclectic; they need to focus systematically on the cognitive and cultural aspects of language acquisition and linguistic management. It is the purpose of this book to outline these aspects of language acquisition by examining, in detail, their basic principles.

Intercultural Foreign Language Classes

When researchers began studying the intercultural aspects of language acquisition and language teaching, they based their research on the objectives of education policies and hermeneutic considerations. Literary genres were meant to help balance the communicative trend toward everyday speech and at the same time provide fresh impulses for the teaching of a new/second/foreign language[1], impulses that were based on theories of reader response criticism (cf. Hunfeld 1997, Wierlacher 1987, Krusche/Krechel 1984, Weinrich 1971). The initial affinity to lyrical texts and the rediscovery of literature expanded to other genres and rejuvenated the communicative teaching paradigm for foreign language classes. This paradigm began to solidify itself as part of the establishment in the 1980s. For more information, compare Wylie, Bégué & Bégué's (1970) demand for an explicitly intercultural approach and the early formulation of confrontative semantics by Müller-Jacquier (1981). It was clear to the language teaching profession that a new, fourth generation of foreign language teaching had emerged, the intercultural generation, or at the very least, version 3.5: the communicative-intercultural generation. This generated substantial interest in integrating new ideas, but it did not lead to a more intense, systematic reflection on intercultural aspects that pertained to a better understanding of language learning everywhere, nor to a more efficient orientation of language learning. The initial euphoria disappeared comparatively quickly even in the field of textbook production, a field which since has experienced shorter and shorter life cycles. As a consequence of the *Common European Framework of Reference for Languages* (CEFR) and its predecessor, the *threshold level project* of the European Council, the (often misunderstood) standardization tendencies seem to cause a regression of language teaching to generation 3 or even 2.5 (see Chapter 1.1 and 3.2.1 on historical approaches to language teaching). The foreign perspective assumed in textbooks today continues to limit itself to superficial, comparative descriptions of foreign cultural artefacts. In addition, cultural studies are still subject to the stigma of 'wasting' supposedly scarce time in the classroom.

[1] The terms are used interchangeably throughout the book and are often abbreviated as L2: L2 teaching, L2 learning, L2 learner.

On the Cognitive Focus

While intercultural aspects are essential to any kind of encounter between languages and cultures, their role in language teaching is often undervalued and their potential remains undeveloped. This is where a focus on cognition can help reshape language pedagogy. After all, the acquisition of languages happens to the largest extent in the brains of learners, not in a classroom, a textbook, a reference grammar, or a fancy computer programme. Cognition, however, is not at all independent of culture(s). On the contrary, general cognition and languages are shaped and propelled by culture. In order to understand how language (understood as a cultural construction) develops in the minds of the learners, and continues to develop, we can turn to various neighbouring disciplines of language teaching research to provide necessary insights. Neurolinguistics, for instance, can shed light on which brain areas are active during language processing and to what extent the brain activity of L1 and L2 speakers differ from each other. Imaging techniques can help visualize neuronal activity related to language, a prerequisite to understanding how language is processed. What can we learn from these insights for practical use? Should teachers regularly monitor the brain activity of the learners in the classroom to optimize classroom interactions and learning progress? It is obvious that a comprehensive language pedagogy cannot be formulated on the basis of such findings alone. However, data on the neuronal activity of language-related processes can help to establish better models for language processing and the multilingual mental lexicon. Without such research, these models would be verified merely with behavioristic data. Cognitive linguistics, in this respect, fulfills a similar function as neurolinguistics in that both research disciplines represent a field of reference whose insights are useful and relevant to the practical classroom situation. Cognitive linguistics explains language and language acquisition in a way that is compatible with the findings of other cognition-based disciplines. Cognitive processes such as metaphorization processes, prototyping, and schematization, for instance, are used for the description of certain language phenomena. Language acquisition can thus be explained through general learning mechanisms such as the formation of analogies or schematization.

Hence, our approach to language learning and teaching employs cognitive linguistics, psycholinguistics, neurolinguistics, and cognitive cultural sciences as referential disciplines. These disciplines do not necessarily adopt

cultural or intercultural aspects in a way which is essential to understanding language contact and language acquisition. Therefore, the approach on cognitive language pedagogy presented in this book takes culture-sensitive stance on cognitive sciences.

Structure of the book

The book relates the theoretical basics of language acquisition to practical aspects of language teaching. It views language acquisition from the perspective of the learner's abilities to enhance their linguistic and communicative repertoire. How cognition and language are connected, therefore, constitutes the guiding question of this book. In order to investigate the complexity of aspects involved, this book begins by briefly summarising insights into research on the human brain as it relates to language, that is, by describing the hardware for language acquisition and cognition. After presenting the most relevant facts about the physical basis of the cognitive system in the brain, the book takes a closer look at how the cognitive system facilitates the representation of concepts, images, and image schemas as well as processes of meaning generation and mental mapping, such as metaphorization processes. Such processes are best explained and illustrated in the metaphorical domains of space and time and their interrelationship. Spatiality and temporality are among the most crucial domains of all known languages and, therefore, well suited to be presented in detail. These domains are also central to cognitive grammar, the most important reference discipline to cognitive language pedagogy. The book presents the foundations of cognitive grammar as they relate to the construction and acquisition of languages. Processes of chunking and dechunking have been found to be crucial for learners in constructing language inventories. Furthermore, if we take a learner's perspective on the construction processes, then the organization of and access to the multilingual lexicon and language comprehension and production processes provide crucial insights into the acquisition of foreign languages. Despite the fact that linguistic material can be separated into the most atomized of units such as phonemes, syllables, words, and sentences, using language and communicating are much more than the mere combination of these atoms. It is the cognitive processes that make sense of the spoken or written material and generate meaning. Therefore, if learners are supposed to communicate in a foreign language, they ought to be able to produce coherent and cohesive

texts, but it is not the product that counts in language teaching but the text generation processes themselves, similar to reading and producing hypertexts. As a result, the book deals extensively with information processing and mental mappings in intercultural contexts and other cognitive processes involved in reading, listening, speaking, and writing in a foreign language. The book then goes on to discuss aspects of multimediality, multimodality, and multicodality in the construction of communicative competences in learners of foreign languages. These aspects deserve much more attention than commonly accorded in language pedagogy because theories of multimedia learning challenge the most fundamental assumptions of traditional and modern language teaching methods. They also open challenging ways to reconceptualising language teaching approaches, including the teaching of grammar and the most modern task-based and content-integrated approaches.

The book concludes with a programmatic chapter that incorporates all listed aspects of cognitive, psycho-linguistic, linguistic, intercultural, media-based, and pedagogical research in that it presents a theoretical framework of a cognitive model of language pedagogy, a model which is based in cognitive grammar but focusses on employing the intercultural processes of linguacultural encounters. How the model works in practice is explained and illustrated in the final segments of the chapter.

Each chapter contains various experiments and review questions for a lively reading experience and for easy transfer into teaching practice. The chapters can be used in random order or following the thematic progression. Ample references to research literature create access to further reading and perspectives.

1 Language Learning and Cognition

Similar to neurolinguistics, cognitive linguistics is a neighbouring discipline whose findings are particularly relevant and valuable to teaching practice. These findings, however, are not directly transferable due to the introspective nature of the methods with which they are obtained. Cognitive linguistics explains language and language acquisition in a way that is compatible with findings from other cognitive disciplines: cognitive principles such as metaphorization or prototype effects serve to characterize particular language phenomena. Universal learning mechanisms explain language acquisition processes such as analogy formation or schematization. Cognitive linguistics and neurolinguistics are, therefore, both important reference disciplines which serve as the basis of a cognition-based approach to language pedagogy. In this chapter, we will introduce the basic assumptions and methods of these two disciplines along with qualitatively new ways of teaching language and culture. In particular, this chapter will conduct a historical review of linguistic and grammatical theories up to the present day and delve into the organizational principles found in all natural languages.

1.1 Cognitive Linguistics

In this chapter, we explore several fascinating questions: how do language, thinking, and cognition relate to each other? To what extent does language reflect the general conceptual system of human beings? According to which general principles are natural languages organized? In order to answer these questions, we will conduct a historical review of linguistic and grammatical theories up to the present day. We will subsequently delve into the organizational principles found in all natural languages, as well as into each linguistic field (syntax, morphology, and the like). Finally, we will show how different conceptualizations of a scene or rather of an event are reflected in linguistic formulations.

Study Goals

By the end of this chapter, you will be able to:

- understand various historical and current research perspectives concerning the relation between language, culture, and cognition
- understand the basic premises of cognitive linguistics and distinguish cognitive linguistics from other approaches
- recognize the advantages of cognitive linguistic approaches for explaining grammatical phenomena
- identify the most important elements of cognitive language pedagogy and establish their added value for teaching practice.

1.1.1 World, Language, Thought

There is a persistent and widespread myth that language should be a neutral medium that does not interfere with reality and thought, a transparent glass surface that offers an unobstructed view of meaningful content. For example, Savory's (1967) book *The Language of Science* begins with an epigraph suggesting that the intermediary function of language is responsible for making it harder to acquire knowledge: "There can be no doubt that science is in many ways the natural enemy of language". Such concepts are remarkable insofar as that the importance of language as a constitutive instrument in the process of perception and knowledge acquisition, i.e., the

foundation for complex mental constructions and not its detractor, has already been discussed exhaustively in numerous important works. Influential philosophers of language ranging from Humboldt, Locke, Vico, or Condillac to Casagrande, Osgood, Hjelmslev, Ullman, Schlesinger, Vygotskij, and Weinreich, as well as those that followed in their footsteps, have provided ample evidence for the interdependence of language and thought. However, it seems that they left only a few impressions on the public at large, and equally few across large portions of science and academia.

Vygotskij describes the words of a language as a microcosm of human consciousness. It is constantly changing in the process of the phylogenetic development of languages:

> Linguistics did not realise that in the historical evolution of language the very structure of meaning and its psychological nature also change. From primitive generalizations, verbal thought rises to the most abstract concepts. It is not merely the content of a word that changes, but the way in which reality is generalised and reflected in a word […]. (Vygotskij 1962: 121)
>
> Thought and language, which reflect reality in a way different from that of perception, are the key to the nature of human consciousness. Words play a central part not only in the development of thought but in the historical growth of consciousness as a whole. A word is a microcosm of human consciousness. (Vygotskij 1962: 153)

Boas concludes from language comparisons that languages each focus on different aspects of an overall concept or rather of an overall mental image. This is an aspect which we will revisit once more when discussing the concept of perspectivization, which has far-reaching implications for cognitive language pedagogy:

> When we consider for a moment what this implies, it will be recognized that in each language only a part of the complete concept that we have in mind is expressed, and that each language has a peculiar tendency to select this or that aspect of the mental image

> which is conveyed by expression of thought. (Boas 1911; quoted in Slobin 1996: 71)

Scientists such as Heisenberg and Einstein are also aware of the fact that language and knowledge are interconnected in different ways. While Heisenberg discusses the necessity of concepts for understanding the world, Einstein picks up on the cognition and identity-shaping character of language and the formation of the linguacultures:

> The existing scientific concepts cover always only a very limited part of reality, and the other part that has not yet been understood is infinite. (Heisenberg 1958: 201)
>
> What is it that brings about such an ultimate connection between language and thinking? […] the mental development of the individual and his way of forming concepts depend to a high degree upon language. This makes us realise to what extent the same language means the same mentality. (Einstein 1981: 7)

Cognitive linguistics systematically deals with how thinking about mental models and image schemas are represented in language, and how these models further influence our thinking. This has far-reaching implications for how the way language works can be made visible and relevant for everyday use and, consequently, how language can be taught. In the following section, we outline the basics of this comparatively new linguistic approach.

1.1.2 The Road to Cognitive Linguistics

Ferdinand de Saussure strongly influenced the founding of modern linguistics. According to Saussure's structuralism, language is differentiated into **langue** and **parole** (cf. Albrecht 2007: 27). Saussure defines langue as a system of symbols and rules determined by social conventions. Parole, on the other hand, he describes as the use of this system by individuals. It is worth noting that these symbols, their use having been established by convention, are always arbitrary in the allocation of what they signify (**signifié**, **signified**, the meaning of the sign) and how they signify the signified

(**signifiant**, **signifier**, the form of the sign) (cf. Albrecht 2007: 43). Accordingly, languages can be considered an abstract set of rules and symbols, which are related to conventions and individual use first and foremost. Originally, Saussure had considered expanding his theory with the trichotomy **langage-langue-parole**, whereby **langage** described the language ability of human beings that is applied to langue and parole (cf. Albrecht 2007: 29). Saussure, however, did not explain how the components langue and parole are related to each other in his theory of language. More importantly, he did not explain how individuals are actually able to acquire the system and its use in the first place (cf. Geeraerts/Cuyckens 2007: 11). Years later, Chomsky (1965) included this aspect in his theory of transformational grammar (also called generative grammar) and explained it, among other things, with the presumed existence of an innate language acquisition mechanism (LAD). According to Chomsky, every individual possesses an innate **universal grammar**, in which the necessary knowledge on the system of a language is stored. Chomsky described it as the **competence** of the individual (cf. Hoffmann 2003: 2). With competence and the existence of universal grammar, the individual is also able to use the language system, for which Chomsky used the term **performance**. This is more or less equivalent to de Saussure's concept of parole, although it only plays a secondary role in transformational grammar (Smirnova/Mortelmans 2010: 11). However, in Chomsky's theory, the social dimension and the communicative function of language and language acquisition were being completely ignored (cf. Geeraerts/Cuyckens 2007: 11). For example, Chomsky interprets grammar as a rather abstract set of rules that can be established by **transformations** (replacement and conversion rules) (also cf. Klenk 2003: 71). The respective underlying transformations should enable the transition from a deep structure into a syntactic surface structure or concrete utterances (cf. Klenk 2003: 74). Accordingly, grammar is formally operational and forms a coherent set of rules. Individuals can only modify it to a very small extent, and it can function relatively independently from meaning and general cognition. From this perspective, language is determined by a universal grammar and is quite rigid: it cannot be easily manipulated by non-linguistic cognition.

It was not until the end of the 1980s that cognitive linguistics led to a paradigm shift from a mainly syntax-oriented language description to a meaning-oriented one. Langacker (2008a: 8), one of the most important representatives of cognitive linguistics, claims "[i]f generative linguistics views

syntax as being central to language, Cognitive Linguistics accords this honor to meaning". Cognitive linguistics consequently emphasizes the symbolic function of language, whose parts or symbols are described as pairs consisting of (phonological) form and meaning. The conceptual organization principles of the symbolic system of language – and of grammar in particular – explain cognitive linguistics mainly via general processes and phenomena of human cognition, such as analogy formation, categorization, composition, prototype effects, and the like (cf. Langacker 2008b). Thus, language description attains a cognitive plausibility. The changeability of the symbolic system by the speakers themselves, in contrast to previous approaches, is emphasized strongly in cognitive linguistics: substantial importance is given to the actual use of the linguistic system and a speaker's knowledge of its use. The grammar is held responsible for a speaker's knowledge of the full range of linguistic conventions, regardless of whether those conventions can be subsumed under more general statements (Langacker 1987: 494).

This shows that the speaker's linguistic knowledge is crucial. Consequently, cognitive linguistics turned away from Chomsky's generative grammar. The main part of the criticism directed towards generative linguistics includes the following aspects:

- The autonomy of the language module postulated in generative grammar is no longer acceptable, since language as part of the human cognitive system also works in accordance with general cognitive principles (cf. Barcelona/Valenzuela 2001: 19). Examples are the metaphorization processes in language, during which concrete, non-linguistic experiences are used as a conceptual base for abstract concepts.
- Large parts of language are contrived as exceptions in generative grammar and thus excluded. Cognitive linguistics, on the other hand, describes linguistic realizations as parts of a continuum which is able to portray the proximity or rather the distance to a prototype (cf. Evans/Green 2006).
- The generative perspective regarding language acquisition as a natural phenomenon and as an innate human ability is no longer represented in cognitive linguistics. The idea of language as a formal set of rules detached from a social and cultural context is thus rejected (cf. Geeraerts/Cuyckens 2007: 13). Instead, language is

viewed as a product of the interactions between individuals in a particular cultural context, and thus comprehended as a code created by human beings and acquired via general learning mechanisms.

Various approaches have emerged in the field of cognitive linguistics with the aim of achieving greater plausibility between language description and general human cognition. Among these are **cognitive semantics** (Talmy 1983, 2000), **construction grammar** (Bergen/Chang 2005, Croft 2001, Fillmore 1988, Tomasello 2003), **conceptual metaphor theory** (Lakoff/Johnson 1980, Lakoff 1987), and **cognitive grammar** (Langacker 1991). Although each of these approaches share the basic premises of cognitive linguistics, they all differ in their focus. The most important constitutive features of cognitive linguistics are:

- Language is a symbolic system.
- Language is part of general human cognition.
- Language is a usage-based system.

We will expand upon our understanding of these features in the next section.

1.1.3 Basic Premises of Cognitive Linguistics

The first basic premise concerns the symbolism of language (cf. Evans 2012). Like previous grammatical theories, cognitive linguistics considers language to be symbolic. Symbols are the basic units of language and consist of a meaning component and a form component. Therefore, all areas of language, including grammar, are always meaningful (see Langacker 2008b: 8). This resulted in an important insight in terms of grammar, namely, that it is no longer perceived as an abstract and arbitrary set of rules. Rather, it forms a continuum of symbolic structures in conjunction with the lexicon (cf. Langacker 2008a: 67). In this way, both the word *coffee maker* and various grammatical cases each have one or more meaning(s). In an inversion of this argument, this means that teaching vocabulary as well as teaching grammar is actually about teaching meaning. Without the meaning component, the symbolic unit cannot be fully acquired (see Langacker 2008c). Despite these similarities, there is a very obvious difference between the meaning components of both symbols. The meaning of the word *coffee maker* is relatively immediate and can be concretely

determined. Meanwhile, the meaning of the case system of a language such as Russian, Latin or German is more complex, less tangible and possesses a higher degree of abstraction, called schematization (cf. Langacker 2008b: 22, Meex/Mortelmans 2002: 51). Talmy (2000) takes a closer look at this difference: the semantic function of grammar or rather of grammatical structures is to represent the conceptual structure of language, while the semantic function of the lexicon or rather lexical structures is to represent the conceptual content. In other words, grammar is the conceptual structure that organizes conceptual content, i.e., the lexicon. Talmy (2000) was not primarily concerned with elaborating on the principles of the conceptual structure of language, grammar. Instead, he was mainly interested in indexing the general conceptual system of human beings using language. Thus, according to Talmy, language is a means of observing general cognitive structures.

Talmy's position necessitates another basic premise: language is not a separate module in the human mind, but is a part of general human cognition and follows the same principles. This premise is also known in research as the **cognitive commitment** (cf. Evans/Green 2006: 193). According to this commitment, language and grammar also reflect the organizational principles of the conceptual system. Aspects of perception as well as processes of figurative thinking, and metaphorization are closely related to the symbolic system of language. These processes in turn feed on physical experiences (for example movement, pressure, strength, part-whole-relationship, verticality, etc.; cf. Evans/Green 2006). Let us take the following sentence as an example: *Some inner cities are run down due to a lack of investment by the upper classes*. In this example we clearly see how abstract concepts of language can be structured by concrete physical experiences: DOWN is bad, UP is good. The physical experience of verticality in space is applied to something abstract and intangible. This process of **metaphorization** (or mapping; cf. Gibbs/Ferreira 2011), according to the conceptual metaphor theory (Lakoff/Johnson 1980, Lakoff 1987), is a central tool of human thought and action. It is the use of metaphorization processes in particular that opens up qualitatively different ways of conveying seemingly abstract language areas such as grammar. Metaphors are ultimately based on physical experiences which are equally pronounced in every learner.

The third basic premise of cognitive linguistics is that language is **usage-based** (also cf. Evans 2012, Behrens 2009: 429, Langacker 2009: 628). According to the usage-based approach, speakers use general learning

mechanisms such as generalization, categorization, or composition to recognize similarities between individual utterances and identify patterns (cf. Langacker 2008b, 2009) instead of these mechanisms themselves driving speakers to use language. Cognitive linguistics dissociates itself from the assumption of an innate grammar in the belief that the establishment of language structures requires an intensive analysis of authentic utterances from input. By adopting the gradual schematization of language structures from concrete utterances, cognitive linguistics emphasizes the importance of language usage in a communicative, or rather social, context. The coding and symbolization of meaning in a language provides shared knowledge within a language community hereby establishing the social and interactive function of language (cf. Evans/Green 2006). This entails a significant consequence for grammar teaching: the increasing schematization and categorization of the linguistic utterances within a grammatical structure cannot be substituted by an explicit explanation of the rules (cf. also Achard 2008: 440). The relevance of the usage-based approach for the teaching of language and culture is discussed in more detail in Chapter 8.

In addition to the three basic premises, cognitive linguistics also postulates the existence of organizational principles for human languages. These are not only identical in all linguistic fields (syntax, morphology, lexis, and the like), but also apply to general human thought processes, such as categorization according to prototypes or polysemy. We will explore these principles in the next section (cf. Jessen/Blomberg/Roche 2018 for an introduction to cognitive linguistics with special emphasis on morphology, imagery, grammar, linguistic diversity, textlinguistics, language acquisition, and gesture).

1.1.4 Organizational Principles of Natural Languages

We do not simply perceive the world as a random jumble, or allow all impressions to penetrate into our brains and somehow manage them. Instead, we sort through our non-linguistic and linguistic input. This aspect of our thinking is reflected in the organization of language in the minds of speakers (and hearers). According to Evans & Green (2006: 28; cf. also Evans 2012), natural languages are organized according to certain principles, which are observable both in the lexicon and in grammar. In what follows, we will explain some of these principles in reference to Radden (2008).

1.1.4.1 Prototypes

The **prototype effect** is an important principle. Cognitive psychological research has shown that the organization of concepts as basic cognitive entities does not follow certain criteria or fixed definitions but follows the principle of centrality instead (cf. Evans/Green 2006: 28, Geeraerts 1989, Radden 2008). The prototype effect can most likely be explained by the fact that, due to a certain distance (deviation), our conceptual categories are often not easily compatible with actual experiences (Rosch 1975). Thus, prototypes should be regarded as central representatives of a certain category. Other representatives of the same category differ in their intensity and dimension from the prototypes (Barcelona/Valenzuela 2011: 21). The central representative usually possesses the maximum number of characteristics that can (but need not) be shared with the other representatives of the category. The conceptual organization according to prototypes also assumes that there is no characteristic that must be common to all the representatives of a single category. To illustrate the prototype effect, let us take the concept of the German word *Kugel* (*ball* or *bullet)* as an example:

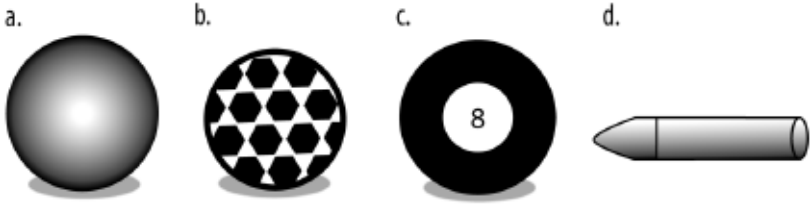


Figure 1.1: Prototype effect, example of the category *Kugel (ball)*

It is obvious when looking at the various figures that a) is the prototypical and best representative of the category *Kugel* (*ball*). While the other representatives of the *Kugel* (*ball*) category can be recognized as such, they differ in some way or another from the central representative: d) represents a metaphorical extension of *Kugel* (*ball*), b) refers to a *ball* in its synonymous use as in (soccer) ball and c) to a certain type of ball, namely a billiard ball (*Billiardkugel*). The distance between the prototype and the other representatives of the category varies according to the type of deviation. As already mentioned, in this example there are no common criteria that define all representatives of the *ball* category. For example, the feature *round object that can roll* is not fulfilled by d) (German *Kugel*, English *bullet*).

Consequently, prototypes according to Geeraerts (1989) can be defined by the following characteristics:

- Prototypes possess members with varying degrees of typicality.
- Peripheral representatives of a prototype are blurred.
- Categories cannot be defined according to criteria.
- The semantic structure of prototypes is organized radially.

The prototype effect, however, not only affects the semantics of individual words, but also phonology, phonetics, and grammar in general. Thus, in the field of phonology, there are various realizations of the same phoneme. Despite their different phonological features, these realizations can be assigned to the same phoneme. Therefore, the realization of the phoneme could be described as prototypical. For example, the sounds [ʁ] and [ɾ] in German are different realizations (allophones) of the same phoneme /R/. Depending on the dialect, one or the other realization of the phoneme /R/ is referred to as prototypical by its speakers. In the field of phonetics, Kuhl (1991) found that vowels such as the sound [i] are internally structured as a category so that the different phonetic realizations of the sound are judged by the proximity or distance to the prototype. Kuhl noticed in additional experiments that there is a magnetic effect (perceptual magnet effect; cf. Kuhl 1998, Iverson/Kuhl 1995): the occurrence of the prototype as a stimulus results in a better evaluation of the surrounding sounds.

The prototype attracts, so to say, the other sounds, as shown in the following figure:

Figure 1.2: Magnetic effect (Kuhl 1998: 58)

Another example of the occurrence of prototype effects within the language system is the fact that not all transitive verbs can be changed into passive (cf. Evans/Green 2006: 32):

1. *He washed his hands*;
   **His hands are washed by him(self).*
2. *The company Bertelsmann possesses more than 70% of RTL Group shares*;
   **Over 70% of RTL Group shares are possessed by the Bertelsmann Group*.

Some transitive verbs do not appear to share the feature of passivization with other representatives of the category. However, it is a circumstance that can be explained from a pragmatic point of view: since the passivization primarily causes a shift in focus from the agent to the patient, such a shift does not appear to be necessary for utterances in which agent and patient are identical (1). Also, verbs such as *possess, have, retain* and similar verbs (2), which associate an owner with a possession (cf. Verspoor/Lowie 2003: 87) do not seem to require the progressive aspect of the passive.

Experiment

Let us conduct an experiment regarding the prototype effect. Think about a specific concept (for example *sofa*, *bicycle*, *tree*, or similar) and look for different images of the selected concept, similar to Figure 1.1. Then number them from 1–5. In the next step, ask three or more volunteers which images are close to the prototype of the chosen concept, and which are more distant.
What can you observe from the results? How would you explain the observed effect to the various volunteers? As a group, think about the consequences your observations could have for your language teaching.

1.1.4.2 Polysemy

The concept of **polysemy** is associated with the prototype effect. It occurs when a linguistic unit has several (poly) meanings (seme). In the lexicon, this striking phenomenon utilizes words, often through metaphorization, to denote different meanings. For example, the word *source*: the word may refer to both *source of groundwater* and *source of information*. Polysemy

is also a common phenomenon in grammar. An often-cited example is the morpheme *-er* in its role as an affix in the nominalization of verbs. It is possible to use the morpheme *-er* for different purposes in German (cf. Wildgen 2008) and English. The combination of a verb with the affix *-er* can mark the agent of a scene (for example, *explorer, buyer*). *-er* can also be used to encode an instrument (for example, *cooker*, *spoiler*) as well. Modal verbs are another example of polysemy in grammar. The modal verb *must* designates both an internal force (for example *I must be honest with my friend*) as well as an external pressure (for example, *I must hand in the report tomorrow*).

1.1.4.3 Taxonomies

Taxonomies represent another organizational principle of natural languages. Taxonomy is a familiar term borrowed from the field of general cognition. Conceptual semantic categories do not float around in isolation in our conceptual system, but are linked to each other in a hierarchical manner (cf. Radden 2008). By using hypernyms (*vehicle* => *car*) and co-hyponyms (*car* ⇔ *motorcycle*), taxonomies provide a way to manage the structure of conceptual knowledge economically (cf. Neveling 2004: 42). In order to systematize vocabulary, some textbooks such as *Memo* employ taxonomic strategies that are based on subordinate or parallel systems (cf. Roche 2013: 93). Vocabulary training is more easily reconciled with the organizational principles of our conceptual system in this way. At the same time, it supports the development of different networks of lexical knowledge, which in turn allow for the use of different memory and retrieval routes. According to Radden (2008; also cf. Neveling 2004), 'basic-level-words' possess a special cognitive conciseness within taxonomies. On the one hand, they provide us with concrete mental images of our experiences, but on the other hand, they do not contain too many details that might possibly make their storage more difficult. However, the memory efficiency of basic-level-words is not only attributed to their cognitive conciseness, but above all to their communicative relevance (cf. Neveling 2004: 44): a word like *car* is more common in communication than, for example, the word *sidecar* and is, therefore, of greater relevance to speakers and learners. For this reason, the teaching of basic-level-words is particularly suitable for the initial phases of vocabulary acquisition.

1.1.5 The Role of Cognitive Linguistics in Language Pedagogy

We have shown during various points in the current chapter how a cognitive linguistic approach can affect language teaching. In the following section, we briefly preview the most important principles of a cognitive language pedagogy.

For a successful acquisition of grammar constructions, it is first necessary to acquire their meaning (cf. Langacker 2008b, 2008c). Secondly, the increasing schematization and categorization of the concrete grammatical structure must be based on authentic input and not on the explicit explanation of rules (cf. Achard 2008). Thirdly, grammar is not an arbitrary and abstract system, but conceptually motivated and organized in accordance with the principles of general cognition and the perception of physical experiences (cf. Evans/Green 2006). We can conclude from this last aspect that grammar should also be teachable through concrete, physical experiences (cf. Littlemore/Low 2006, Suñer 2013: 16). It is the only way to simulate concrete actions mentally and thereby make grammar tangible. Such mediation is supported either by corresponding physical experiences (gestures or facial expressions) or by animations which illustrate a grammatical phenomenon of a language in a cognitive linguistic fashion. In Chapter 8, we show how this is done in various grammatical areas.

As you will see in Chapter 8, task-based approaches prove to be a particularly suitable methodological framework for the use of grammar animations. In line with the cognitive linguistic premises, task-based approaches assume that words and grammar are perceived as actions, and that lessons are learned from their success (cf. also the principle of the complete action cycle). In other words, it is only through the use of language in concrete situations that grammar constructions are acquired and further developed, or, rather, specified according to situational. These principles correspond with the cognitive linguistic postulate of a usage-based approach in the sense that languages are only gradually acquired through their contemporary use in concrete situations (cf. Behrens 2009, Bybee 2008; for more details, see Chapter 8.1). The term **task-based approach** has been established for teaching methods representing the "doing of things with words". In terms of pragma-linguistic theory it would, however, be more appropriate to refer to speech act theory or other theories on language as action, be they linguistically, philosophically, psychologically, or pedagogically motivated. Grammar animations support the mental representation of concrete

actions. They thereby make the connections between specific aspects of actions and the corresponding means of language transparent (compare Chapter 7). This principle can, for example, be applied in such a way that after a first phase of exploring the animations, the learners themselves design the actions in the animations. The learners can review their ideas and see the connection between language and action repeatedly by subsequently replaying the designed situation. In addition, grammar animations can be used particularly effectively in cooperative learning settings (Compaoré 2018). They provide learners a variety of impulses for independent problem-solving within the group, due to their surface-level incompleteness and their inductive form of presentation. Finally, we should mention that the situations that are meant to be depicted in grammar animations should take learners' interests and needs into account, with the aim of generating the necessary salience and relevance. Only by incorporating the world of the learners into the grammar animations, are processes relevant to learning (formation of hypotheses, analogy formation, etc.) initiated, which enable the successive development of the new (foreign) language (cf. Roche et al. 2012: 32).

Following the previous discussion, the field of cognitive language pedagogy may be summarized as follows (for more details see Chapter 8): the term **cognitive language pedagogy** derives from the most important reference discipline of linguistics, cognitive linguistics. According to Evans (2012), cognitive linguistics is based on the following premises:

- Conceptualization thesis: language is conceptualization, i.e., meaning is based on conceptualization.
- Usage based thesis: language is usage-based and therefore develops differently in varying cultural contexts.
- Encyclopedic semantics thesis/embodied cognition thesis: meaning is derived from the totality of knowledge of all conceptual inventories and physical experiences.
- Symbolic thesis: form and meaning are always paired and represent a fundamental unit of language.

Cognitive language pedagogy makes the conceptual and semantic references of linguacultural systems (linguistic systems that represent cultural aspects) transparent and interculturally salient. Cognitive language pedagogy does not only assume structural differences between language sys-

tems, but also assumes that conceptual differences are elements of linguacultural systems. It thus avoids the artificial separation between language and culture, often found in language teaching and cultural education in the form of isolated regional studies. Cognitive language pedagogy adapts language teaching to what a learner is able to handle in a particular developmental phase. It combines the findings of cognitive linguistics with those of language acquisition research, learning psychology, and psycholinguistics. Since languages and their grammars develop phylogenetically and ontogenetically from actions and meanings, cognitive language pedagogy represents a task-based and, at the basic level, regionally and interculturally learner-oriented pedagogy with a strong affinity to communicative principles and authentic linguistic variation.

1.1.6 Summary

- Cognitive linguistics distinguishes itself from other approaches by defining language as a means of conceptualizing reality. Reality is fixed by the interaction between individuals in a particular cultural context and acquired through general learning mechanisms.
- Cognitive linguistics also assumes that language is a meaningful system of symbolic structures which can be explained using the principles of general cognition and cannot be generated by a fixed set of rules. Among other things, prototype effects, metaphorization, and polysemy are appropriate for explaining the lexis and the grammar of a language.
- Finally, the advantages of a cognition-based language pedagogy can be explained by the cognitive plausibility of language description as well as its high compatibility with task-based approaches.

1.1.7 Review Questions

1. What are the major differences between cognitive linguistics and generative linguistics?
2. What is the cognitive commitment in cognitive linguistics?
3. What is a prototype effect and what role does it play in grammar?
4. How would you explain the advantages of cognitive language pedagogy over traditional language teaching methods?

1.2 Language and the Multilingual Brain

Kees de Bot

Language processing is one of the most complex tasks our brain performs. It is a task that requires the cooperation of parts that are connected in a network throughout the entire brain. Some parts are more strongly involved than others. While scientists used to believe that certain language functions are located in specific brain areas, there is now a consensus that no area of the network is solely responsible for language processing. Still, there are many areas of the network in both hemispheres that are of significance.

Study Goals

By the end of this chapter, you will be able to:

- explain which brain areas are important for language processing
- distinguish between different types of aphasia and language recovery in bilingual aphasiacs.

1.2.1 The Brain

The hemispheres of the brain (**cerebrum**) contain distinctive, narrow grooves or crevices on the surface which divide the brain into **lobes**. Each hemisphere contains a frontal, parietal, occipital, and temporal lobe. The frontal lobes are responsible for controlling responses, making decisions, thinking, and planning, as well as voluntary muscle movement (via the motor cortex).

The hemispheres are arranged contralaterally. It means that they control the muscle movements and receive sensory information from the opposite halves of the body. When the sensory information flow is interrupted by a stroke in the left hemisphere, for instance, then the right side of the body and face will be affected while a stroke in the right hemisphere will likely result in the paralysis of the left side of the body. Our frontal lobes plan and control our body movements and behavior and are involved in processing emotions. That is the reason why the frontal lobes are thought to house an individual's personality. The parietal lobes, located behind the

frontal lobes, are mostly responsible for our sense of touch and the interpretation of signals heard, felt, seen, or remembered. Visual impulses are primarily processed in the occipital lobe located at the back of the head. Sound impulses, on the other hand, are processed by the temporal lobes near the ears. This is also where memory and emotions are located. A variety of complex connections and relationships exist between the individual lobes and in between the hemispheres, which are crucial to the proper functioning of the brain as a whole.

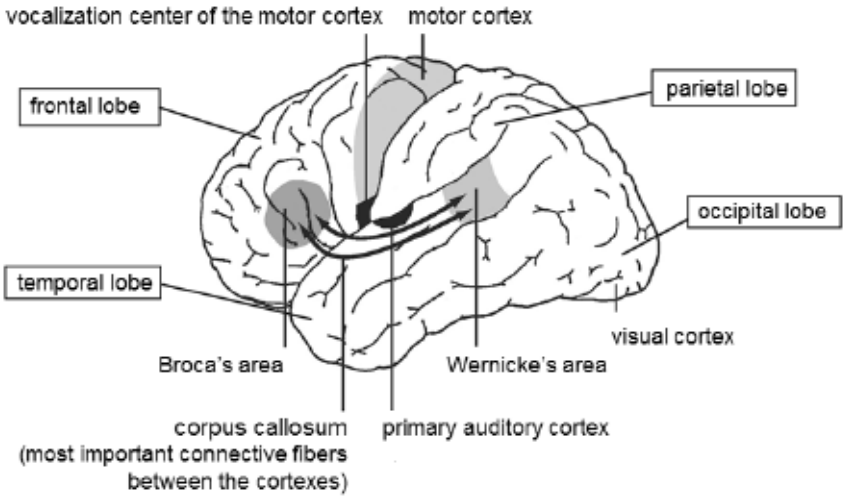


Figure 1.3: Side view of the left hemisphere with its four lobes (frontal, parietal, occipital, and temporal lobe) and its most important processing centres (Roche 2013a: 54)

The most prominent of the areas associated with language processing are the Broca's area and Wernicke's area. The corpus callosum is the main connector between the two areas.

The most pervasive hypothesis on the underlying functions of these classic language areas is that **Broca's area** is mainly responsible for speech production and **Wernicke's area** for language reception. More recent neuroimaging studies suggest, however, that this division is not sufficiently accurate. Researchers have proposed other explanations, such as attributing these areas to grammar (Broca) and meaning (Wernicke). Still, most

studies on this matter agree that these classic language areas are essential to language processing.

1.2.2 Bilingualism and Lateralization: The Bilingual Brain

Before the development of neuroimaging methods, researchers used a number of methods to study the involvement of both hemispheres in language processing. One of these methods was the visual-half-field paradigm: participants had to focus their eyes on a dot in the middle of a screen, while focal point words were projected to the left or to the right of it. After the session, the informants were quizzed on the words presented in the left or right visual half-field. Although findings were often ambiguous, participants typically remembered words presented in the right visual half-field better than the words projected on the left half-field. The presumed explanation for these phenomena was that the right visual half-field was more directly connected to the dominant left hemisphere. Therefore, words in that half-field were remembered best. A variant of this task is auditory dichotic listening. In this task, the participants hear words in their left ear and other words in their right ear. Words heard in the dominant ear (contralateral to the dominant hemisphere) are typically retained better. Researchers then modified the experiment in consideration of the input language. In this version of the experiment, the participants heard two languages simultaneously, one in each ear. The scores of monolinguals served as points of reference for the degree of **lateralization**. In a number of publications, Paradis (2001, 2003, 2007) argues that it is wrong to assume a stronger involvement of the right hemisphere in multilingualism. He also criticizes the testing methods as inadequate and unreliable. He reacts strongly toward attempts to find a unique set of conditions that could produce the desired hemispheric specialization effect. In Paradis' view, the non-dominant hemisphere is involved in figurative and metaphoric language as well as in supra-segmental aspects of articulation. He claimed that looking for a lateral specialization for other aspects of language was comparable to searching for the Loch Ness monster (cf. Paradis 2003). More recent research which utilized neuroimaging techniques has more or less confirmed Paradis's line of argumentation. With the recent growing awareness that language is not tied to a specific area, interest in the lateral specialization of languages has faded. It has been replaced with an interest in the networks of cells spread across both sides of the cerebral cortex.

Language Representations in the Multilingual Brain

In addition to lateralization in bilinguals, many researchers focused on the question of whether a person's different languages activate neurons in the same brain regions or not. Initially, scientists believed that different languages might be stored in different areas of the brain. This hypothesis arose mainly from reported cases of the selective loss of only one of a bilingual's two languages after a brain injury or a stroke. The neurologist Albert Pitres (1895; cited in Paradis 1997) claimed that separate language areas in bilinguals would be highly unlikely. A stroke or brain injury would have to selectively affect the specific language in the four areas that subserve language, namely two sensory centres (one auditory and one visual) and two motor centres (one graphic and one phonetic). Pitres' views have not only persisted to the present day, but have in fact been confirmed and expanded upon by neuroimaging studies.

An interesting study used functional Magnetic Resonance Imaging (fMRI) with the goal to identify the brain regions responsible for word generation. This method utilizes the fact that blood flows to a specific part of the brain when groups of neurons become active in this area (i.e., when this part is used while responding to a specific stimulus sound, image, film, etc.). Our blood contains iron, so when fresh blood flows together, the iron distorts the magnetic field. This in turn is detected by the fMRI scanner.

The study was conducted with both early and late fluent Mandarin-English bilinguals (Chee/Tan/Thiel 1999). No differences in cortical activation were found while subjects silently generated words either in English or in Mandarin, despite the large differences between the languages and their writing systems. The active areas for both languages included Broca's area, a part of the frontal lobe known to be responsible for executive control, and the motor area known to be involved in the articulation of speech. Interestingly, the active regions did not differ between the participants who started learning English before the age of six and those who had started learning English after the age of twelve.

An overlap of active brain regions has also been determined in a study in which fluent Dutch-English-French trilinguals performed different tasks (for example naming and reading comprehension). The data, however, does suggest differences in the intensity and extent of the activation pattern (Vingerhoets et al., 2003). It appears that a more extensive set of brain areas is involved during the processing of the less-proficient or later

learned language. A meta-analysis by Indefrey (2006) of 30 localization experiments confirmed the lack of specific active regions in terms of L2 processing. The studies Indefrey analysed did, however, reveal differences in the strength of activation between L1 and L2. The second language appears to evoke more activation specifically in areas around and including Broca's area.

1.2.3 Neuroplasticity and Second Language Acquisition

For a long time, the brain was viewed as a rigid structure which limited human activity. More recently, the emerging consensus among researchers is that the brain actually reacts and adapts to exterior stimuli. The question that remains, then, is to what extent the acquisition and use of a second/third/fourth language causes functional and structural changes in the brain.

Green, Crinion & Price (2006) worked with a number of studies that have provided data showing a relation between the structure of the human brain and certain learning tasks. The most prominent study is likely Maguire et al.'s (2003) on the differences in brain structures in experienced and novice London taxi drivers. This cross-sectional study showed that the amount of experience in cab-driving correlated with the grey matter density and the size of certain brain areas. Thus, specific experiences led to structural changes in the brain.

Harding, Paul & Mendl (2004) examined the relation between learning juggling skills and learning-induced plasticity in the brain. They compared a group that was learning to juggle with a non-juggling group. The two groups' brains were scanned before the juggling training program commenced, and again three months after the beginning of the training program, as well as three months after that. While there were no differences between the two groups in terms of grey matter density during the first scan, there was a significant bilateral expansion in grey matter in the mid-temporal area and in the left posterior **sulcus intraparietalis** when comparing the second scan to the first one. This difference was observed to increase during the period after the second scan. During this period, neither of the groups engaged in any juggling activity. Visual areas exhibited more plasticity than the motor areas. The reason may be related to the demands of the specific juggling routine, the three-ball cascade, which the partici-

pants practiced. The question now is, can the activity of learning a language also lead to structural and functional changes in the brain? Though the previous sections have in part addressed this question, the next chapter will focus on specific neuroimaging techniques that are used to assess whether the use of second or third languages leads to structural and functional changes or changes in language processing over time within the brain.

1.2.4 Summary

- The classic language areas of the brain are Broca's area and Wernicke's area. They are primarily involved in language production and language comprehension, respectively. More recent neurological examinations propose a more varied explanation, such as attributing the areas to grammar (Broca) and meaning (Wernicke).
- Different languages are not located in different areas of the brain. They reside in the cellular network within the known language areas of the brain.

1.2.5 Review Questions

1. Describe the structure of the brain. Which areas are responsible for language processing?
2. How are multiple languages represented in the brain? What do research findings indicate?

2 Concepts, Images, and Image Schemas

We often resort to bodily experiences that are familiar to us from everyday life to express abstract concepts. This is the case in metaphorical expressions such as *to sit on the fence* (German *zwischen zwei Stühlen sitzen*, literally: to sit between two chairs) or *to give somebody a hand* (German *jemandem unter die Arme greifen*, literally: to grab someone under the arms). We no longer notice that bodily experiences are also the foundation of many areas of grammar. In order to refer to the abstract concept of time, we use expressions such as *we have moved up the appointment* and *pushed it back to next week* which are based on the spatial concepts such as UP and BACK. Other aspects of grammar such as modal verbs utilize the bodily experience of force and dynamics: the modal verb *must* used in the sentence *everyone must pay taxes* can be interpreted as a kind of pressure which forces us into (fictitious) motion. It is instantly evident from these examples how entwined language and imagery are. This chapter revolves around the question of how language can be described using these image-based concepts and how more transparent explanations of structural properties allow for more illustrative, efficient, motivating, and fun-filled language teaching and learning. Chapter 8 provides illustrations of how metaphors can be used in cognitive language pedagogy. We will show how the grammatical phenomena of a language can be made transparent an accessible through metaphoric imagery, a core area of cognitive linguistics.

2.1 Image Schemas and Metaphorization

Foreign language teachers often attempt to illuminate obscure areas of language with the use of images and drawings in class. For example, teachers may use animated words that fly into place on a screen to explain verb positions and colorful highlights to illustrate differences in case endings. Though teachers believe in the added value of such illustrations, these methodical teaching techniques only help the students in digesting the rules of a language. The students remain puzzled about what they consider arbitrary and lacking coherence. Therefore, it is this chapter's aim to explore to what degree language can be described by image-based representations. Following the previous chapter, the first section of the present chapter will therefore look at how the use of image-based concepts manifests itself in language. The next section discusses the role of bodily experiences in metaphorization. The final section revolves around aspects of metaphor processing and notes the consequences of imparting metaphoric competence in a classroom setting.

Study Goals

By the end of this chapter, you will be able to:

- describe the role of images in language
- name and describe the different types of metaphors
- explain the processing of metaphors along with the involved factors
- explain the importance of metaphors in foreign language learning and teaching.

2.1.1 Images in Language

In the previous chapter, we became acquainted with the most important assumptions of cognitive linguistics. Among other things, cognitive linguistics assumes that language is closely intertwined with general human cognition (cf. Evans/Green 2006: 193). This means that many aspects of language and grammar can be explained through the organizational principles of general perception and bodily experiences. In this way, meteoro-

logical phenomena such as rain or sunshine are conceptualized as containers in the English and many Germanic languages (*standing in the rain, sitting in the sunshine/Im Regen, in der Sonne* etc.), while other languages such as Spanish, French, and Arabic conceptualize meteorological phenomena as entities above us (*bajo el sol/bajo la lluvia, sous le soleil/sous la pluie*). Other languages such as Russian even combine several bodily experiences to describe the same phenomena: speakers can choose between conceptualizing the sun as a container or to profile the surface on which the sun shines as the ground (Russian: *Я стою на солнце*; literally: I am standing on the sun).

It is fascinating to look at how bodily experiences systematically influence certain abstract areas of language. Many expressions make use of the concept of verticality (UP, DOWN) to express force relations between entities or persons: one would be *under* pressure or *under* someone's control when one is exposed to a more powerful person or entity. In contrast, persons or entities who inhabit the more powerful position or simply assert themselves can *supervize* or even *surveil* others (*surveiller* in French or *überwachen* in German, 'to over-watch') or *overcome* (German *überwinden*) certain difficulties. Other language areas, such as idiomatic expressions, use figurative language in a very obvious way, as in *I'm all ears, but I wouldn't be surprised if the Prime Minister's new plan doesn't have legs* or *Trying to find a parking spot in the city centre really drives me up the wall/grinds my gear/etc.* In German, with respect to the latter situation, a person might say *Die Parksituation in der Stadtmitte ist zum Mäuse melken* (literally: parking in the city centre is like milking mice), which is just one example of how more colorful imagery can express the same meaning in another language, even though different concepts are used.

While languages differ in how they incorporate bodily experiences and mental images, the process of metaphorization is common to all languages: a certain conceptual content is projected from a source domain to a target domain (Lakoff/Johnson 1980, Roche/Roussy-Parent 2006). Source domains are often concrete concepts, such as pressure, force, verticality, and so forth. Target domains are usually abstract concepts, such as the participation in a discussion or high stress levels due to numerous deadlines. The direction of the projection is always seen as unidirectional from the source domain to the target domain, because the source domain is bound more tightly to the physical experience. According to Grady (2007: 188), metaphors are not simply linguistic conventions, but conceptual associations.

We can conclude, therefore, that every speaker creates new metaphors and elaborates existing ones through conceptual processes. The following excerpt of a conversation shows this kind of creative handling of metaphors in a foreign language. It takes place between learners of English as a foreign language, discussing their learning experiences up to this point. The metaphor *learning a language is immersion (in water)* is the conceptual basis of the following conversation (Littlemore/Low 2006a: 279):

S1 It is best for the students to be *showered* in a lot of English.

S2 But we don't want to *throw them in the water*.

S1 We are not *throwing them in the water*, they are just *in the shower*.

S2 We need to *get them used to the water before swimming*.

S1 But grammar teaching is like *sitting on the tatami mat, and not getting in the water*.

S3 And *there is few* [sic] *water in Japan*, this is why the classroom atmosphere is more important.

Metaphors are dynamic and productive, and are an important means of expression for abstract concepts in all kinds of contexts. However, since socio-cultural and pragmatic contexts also play important roles, making metaphors accessible via conceptual processes alone does not guarantee they will be acquired successfully (cf. De Cock/Suñer 2018, Kövecses 2015: 15; also cf. Yu 2008). It is often the case that unknown metaphors are situated on a continuum ranging from universal bodily experiences to context-sensitive variations (cf. Kövecses 2010). In order to make metaphors accessible, the conceptual content of metaphors should be compatible with both of these extremes. How conceptual metaphors are actually created is our topic for the next section.

2.1.2 How Does Metaphorization Work?

Lakoff & Johnson (1980) distinguish between the linguistic expression of the metaphor and the underlying conceptual metaphor: while a **conceptual metaphor** represents the cognitive mapping and linking of two conceptual domains, the **linguistic metaphor** is the concrete realization of the conceptual metaphor. In general, conceptual metaphors are, therefore, not expressed verbally. In that sense, they are not visible. They provide the conceptual base structure for determining linguistic metaphors. The basic

structure of two linguistic metaphors in the following example, for instance, is provided by the conceptual metaphor '*argument is war*', even though it is never explicitly stated.

The members of parliament attacked the chancellor over the refugee agreement with Turkey, but she was capable of defending herself.

As you have probably noticed, not all conceptual metaphors are the same. Some incorporate bodily experiences such as verticality or sometimes concepts such as war or immersion in water (cf. Littlemore/Low 2006a). Is there a way of categorizing metaphors according to general criteria? Lakoff & Johnson's **conceptual metaphor theory** (1980) distinguishes between three main types of metaphors: structural metaphors, orientational metaphors, and ontological metaphors. Structural metaphors involve the mapping between two specific concepts such as *love is a journey*. These can be expressed by linguistic metaphors such as *our relationship has hit a dead end* or *we want to journey through life together*. Orientational metaphors, by contrast, use **image schemas** that can be derived from real-life bodily experiences. Examples are movement, force, verticality, etc. Expressions such as *don't get ahead of yourself* or *the interest rates are rising continuously* use such image schemas as their conceptual base. In ontological metaphors, abstract concepts are conceptualized as objects or containers. An expression such as *to have/give someone/steal an idea* presuppose the conceptual metaphor *an idea is an object*. Humans as recipients of emotions might also be coneptualized as containers, e.g., *he has fallen in love with his colleague* or *the coach has put her complete trust in the team*. Although classifying conceptual metaphors in accordance with these three main types may seem plausible, it is not safe to assume that all metaphors are so easy to put into one of these categories. It is often the case that metaphors, even different types of metaphors, are combined with each other within a single sentence (cf. Littlemore/Low 2006a, Drewer 2003: 7). Take this sentence, for example: *He always put her wishes ahead of his.* Both an orientational metaphor ('foreground is important') and an ontological metaphor ('wishes are objects') are present in this sentence.

The conceptual metaphor theory has been criticized for the direction of metaphoric projection (cf. unidirectionality hypothesis, Jäkel 2003). The original theory states that metaphors emerge from the unidirectional mapping of a source domain onto a target domain. Alternative approaches such as the conceptual blending theory (cf. Fauconnier/Turner 2002) show, however, that mapping can be bidirectional. It may, in part, even create

new conceptual content that is contained neither in the source nor the target domain. The blending process is especially productive in the area of word composition, as seen in the word *brunch,* a word that emerged from the blending of the concepts *lunch* and *breakfast* (cf. Radden 2008). In this case, blending creates an additional mental space which exhibits characteristics that are neither contained in the concept of *breakfast* nor in the concept of *lunch*, such as time of day or exceptionality. Weinrich (1976), in his image field theory, stressed both the importance of context in mapping domains as well as the blending of words to generate metaphors (e.g., *Windrose* (German)/wind rose (aka compass rose)). Lakoff/Johnson's (1980) corpus was quite limited, so that it cannot be used as evidence of a practical use of metaphors in discourse. The suggested methods for the analysis of metaphors, as well as the analyses themselves, have also been characterized as quite intuitive, as the evidence is chosen specifically to justify categories created ad-hoc (cf. Kövecses 2015, Gibbs/Ferreira 2011). Conceptual metaphor theory also does not explain how metaphors, especially innovative metaphors, are actually processed under different circumstances (Boudle/Gentner 2005).

Other cognitive linguistic approaches such as cognitive grammar (Langacker 2008b) or cognitive semantics (Talmy 2000) have also used metaphorization to explain the conceptual motivation of grammar. Talmy (2000) and Sweetser (1990) described causal connectors and modal verbs using the concepts of force and dynamics, while Langacker (2004) described transitive scenes with the concept of energy transfer. These image schemas help to describe the abstract and often nebulous meaning of grammar as a conceptual structure that organizes the conceptual content of lexical units. The following section deals with the question of what exactly image schemas are, and how they are used in metaphors.

2.1.3 The Use of Image Schemas in Language

The term **image schema** was coined by Johnson (1987) who described it as a recurrent sensory pattern of an optical, auditory, haptic, motor, or olfactory nature. We recognize these patterns in our bodily interactions with the environment and store them in schematic form (also cf. Evans/Green 2006). We derive image schemas from bodily movement, the manipulation of objects, the perception of pressure and external forces and so on, which serve as a blueprint for structuring conceptual content (cf. Grady 2005).

Some examples of image schemas are SOURCE-PATH-GOAL, PART-WHOLE, CONTAINER, OBJECT, PRESSURE, FORCE, and so on (cf. Johnson 1987, Oakley 2007; see Table 2.1). Because image schemas stem from sensory experiences, they maintain information specific to the respective sensory modality, which can be evoked through processes of figurative thinking, e.g., through mental simulations, and take the form of sensory representations (cf. Johnson 2005: 20). Wilson & Gibbs (2007) observed that simulation facilitates the processing of metaphors. The subjects of their study imagined the physical act of pushing or performed it physically before being introduced to the metaphor *to push an argument*. The resulting priming effect was not observed when the participants of the study performed non-relevant actions such as chewing gum. Gentner (2001; also cf. Gentner/Imai/Boroditsky 2002) also examined the use of temporal metaphors and found that the expression of time concepts in different metaphor systems can incur longer reaction times. However, the increase in reaction time disappears when the time concepts expressed are based on the same metaphor system. All these experiments help show to what extent concepts from the source domain influence the expression of abstract concepts.

SPACE	UP-DOWN, FRONT-BACK, LEFT-RIGHT, CLOSE-DISTANT, CENTRE-PERIPHERY, CONTACT, STRAIGHT, VERTICALITY
CONTAINMENT	CONTAINER, IN-OUT, SURFACE, FULL-EMPTY, CONTENT
LOCOMOTION	MOMENTUM, SOURCE-PATH-GOAL
BALANCE	AXIS BALANCE, TWIN-PAN BALANCE, POINT BALANCE, EQUILIBRIUM
FORCE	COMPULSION, BLOCKAGE, COUNTERFORCE, DIVERSION, REMOVAL OF RESTRAINT, ENABLEMENT, ATTRACTION, RESISTANCE
UNITY/MULTIPLICITY	MERGING, COLLECTION, SPLITTING, ITERATION, PART-WHOLE, COUNT-MASS, LINK(AGE)
IDENTITY	MATCHING, ISUPERIMPOSITION
EXISTENCE	REMOVAL, BOUNDED SPACE, CYCLE, OBJECT, PROCESS

Table 2.1: A partial list of image schemas according to Evans/Green (2006: 190)

How can we characterize image schemas more precisely? According to Oakley (2007; also cf. Evans/Green 2006), image schemas possess the following traits: first, image schemas often feature complex inner structures that make transformations possible. The image schema SOURCE-PATH-GOAL may, for pragmatic reasons, focus on the origin or the goal and be transformed in such a way that only individual parts are evoked (path-focus versus endpoint-focus according to Johnson 1987). In sentences such as *I'm going to class*, we exclude information pertaining to the origin, because it is either already known or simply irrelevant. Second, while image schemas are derived from concrete sensory experiences, they can be processed in different modalities (cf. Evans/Green 2006: 186). The image schema BLOCKAGE is motivated either visually (for instance through the observation of object movement impeded by applying counterforce), or haptically (such as by feeling the counterforce via the object or the person impeding the movement). Third, according to Evans & Green (2006: 187) image schemas can be grouped into clusters, attributable to certain basic

domains of experience. Accordingly, all image schemas of a group have one common feature: for example, image schemas of the group FORCE express causality (a force always comes from a source), directionality (a force always has a direction), and a force can be represented on a scale of intensity (a force can be stronger or weaker) (cf. Evans/Green 2006).

However, there are also other types of knowledge representations present in our minds, such as general schemas and mental images. How can we differentiate between image schemas and these other **mental representations**? While image schemas intersect with mental images and general schemas in several areas, they are nonetheless set apart from them due to their universality and their level of abstraction. Image schemas, according to Oakley (2007: 216), are much more dynamic and flexible when compared to other schemas that we possess as more abstract, structured knowledge about concepts and behavioural patterns (also cf. Rumelhart 1975). While the abstractly stored knowledge on security procedures at the airport can only be applied to these specific situations (i.e., presenting the boarding pass, checking carry-ons, removing laptops and liquids, etc.), image schemas such as SOURCE-PATH-GOAL apply to all movements from Point A to Point B, be it in an airport or at a wedding. The various slots of the image schemas can be filled with different items than schemas of concepts and actions. Mental images are also not as universally applicable, because they depict concrete situations and are, therefore, more specific (cf. Oakley 2007: 216; see Figure 2.1). The mental image of the last wedding you attended, for instance, cannot be generalized to apply to all weddings, since both bride and groom and their situation are unique, even if they wear similar clothes in the same location and speak the same words, possibly even with the same people in the audience as other couples do. The applicability of mental images is limited to this concrete situation. This means that mental images also allow us to visualize the situation concretely, providing a unique index for an event or episodic sequence. Image schemas would be too abstract to differentiate between different iterations. However, mental images and image schemas are both of an analogue nature: they create analogous mental representations of sensory experiences and activate additional aspects that correspond to the respective sensory modality (cf. Evans/Green 2006, Seel 2003).

Figure 2.1: Mental representations

Literature on the subject discusses more features of image schemas that remain controversial, such as the fact that some image schemas are not exclusively perceptual, but are also based on prior knowledge and, therefore, possess conceptual aspects (Grady 2005). Another controversial aspect is the universality of image schemas, which according to some authors (Kimmel 2005: 41), cannot always be safely assumed to apply. For a more in-depth discussion, see Kimmel (2005), Grady (2005), or Zlatev (2005).

2.1.4 Pictorial and Multimodal Metaphors

Conceptual metaphor theory assumes that conceptual metaphors manifest mainly on the linguistic surface while ignoring the roles of static and dynamic images as well as those of music or gestures. Therefore, Forceville (2008) advocates that the scope of the term metaphor should be expanded to include **pictorial** and **multimodal** metaphors. Both of these metaphor types have in common that their source and/or target domain is of a non-verbal in nature. They differ, however, in being monomodal or multimodal. While multimodal metaphors combine various coding systems and sensory modalities such as language, music, and images, pictorial metaphors are exclusively rooted in image-based information.

Pictorial metaphors come in different types. In Figure 2.2 you can see how contextual image-based information (in this case the accompanying picture) aids in the analysis of the metaphor *learning languages is a struggle*.

It evokes the notion that the language school supports the students in overcoming war-like communication situations in the new language. Forceville, accordingly, calls this type of pictorial metaphor a **contextual metaphor** (Forceville 2008: 464).

Figure 2.2: Wall Street English (Source: wallstreetenglish 2016). Approximate translation: Wall Street English. They have me covered. (Alternatively: The type of back-up I like best.) 15% discount on all standard courses* Get your discount now.

The **hybrid metaphor** is another type of pictorial metaphor which combines source and target domains in the same pictorial composition, creating a new, hybrid figure which does not exist in reality (Forceville 2008: 456). For example: a nuclear energy barrel (see Figure 2.3) is depicted with human legs in order to illustrate the sentence *Der Atomkraft Beine machen!* (to put pressure on the nuclear energy industry, literally: make atomic energy legs!, similar to giving someone the boot, or at the very least, a run for their money).

Figure 2.3: "Der Atomkraft Beine machen!" (Jusos Drensteinfurt 2016). Approximate translation: Give nuclear energy the boot!

Experiment 1
What do you expect from a coffee maker? Which image schemas would you use to describe its functions? See whether or not the outer appearance of the following machine meets your expectations. Why or why not?

Figure 2.4: Coffee machine (Heise 2016)

In contrast to hybrid metaphors, **integrated metaphors** do not actually depict an unlikely figuration, but merely imply one. The altered form of the coffee maker in this advertisement implies a servile stance, indicating a

metaphorical relationship of *the coffee machine is a waiter* or *is a butler*, i.e., that the coffee machine serves the fully prepared coffee like a real waiter would (cf. Forceville 2008: 468). The last type of pictorial metaphor, pictorial comparison (also called **simile**), presents the source and target domains as two independent entities (for instance as two objects, side-by-side), thereby evoking similarity.

In contrast to pictorial metaphors, multimodal metaphors combine various coding systems or modalities of perception (Forceville 2008: 467). For example, music and pictures can be combined to evoke the intended metaphor. A concrete example is the commercial for the cat food "Xirah" (though you should probably let your own cat decide whether or not there is any truth in advertisement here). The ad dramatizes a dispute over food between a cat and a dog, in which two very specific elements evoke the metaphor '*a dispute over food is a wild west duel*'. An excerpt of Ennio Morricone's famous theme from the Western movie "The Good, the Bad and the Ugly" plays in the background, and the dog's entrance into the room via a swinging saloon door is a classic Western movie trope. Elements of different modalities activate the conceptual content of the source domain. At a more practical level, the use of pictorial and multimodal metaphors has proven beneficial to increasing L2 learners' awareness of the use of imagery in specialized domains (economics, journalism, etc.), by triggering metaphorical reasoning and encouraging the exploration of creative meaning constructions (Birdsell 2019: 119).

2.1.5 Processing Metaphors

Now that we have made ourselves familiar with the process of metaphorization and the different types of metaphors, we turn to the question of how metaphors are actually processed, and which factors are significant in making this happen. Nevertheless, since most approaches to metaphor processing do not incorporate learning new languages, we will present only the basic premises of these approaches (for a more detailed presentation, see Littlemore/Low 2006b: 46) before discussing the importance of the acquisition of metaphoric competences in language teaching.

To date, researchers have formulated numerous theories about metaphor processing, each emphasising a single aspect (for instance: the context, the metaphor's popularity, salience, etc.) and, for the most part, providing the salient empirical evidence. However, you have probably already realized

that several factors affect how people understand metaphors. One important ongoing debate concerns the extent to which the conceptual content of the source domain is activated in order to understand a metaphor. Searle (1979, borrowing terminology established by philosopher H. P. Grice 1957) supports the position that metaphors are initially recognized as violations of so-called maxims of conversation, specifically the maxim of quality ('an utterance should generally be regarded as being true'). In order to be understood, this apparently untrue utterance (at least in the literal sense) must be interpreted with the use of so-called implicatures. In this process, the entirety of the conceptual content is activated and participants of the conversation search for possible interpretations which fulfill the pragmatic criteria of the communicative situation. Accordingly, this means the relevant aspects of the source domain are accessed **indirectly**, i.e., through interpretation, when using or encountering the metaphor.

Other approaches, like Gibbs' (1994) **direct access view**, postulate a **direct** path to the relevant conceptual content of the source domain. They assume that the concepts of the source domain possess a concrete, as well as a figurative meaning, so that the speaker or listener can directly activate the appropriate meaning (cf. Glucksberg 2008). Accordingly, processing the figurative meaning of a metaphor should not take up more time than processing its literal, concrete meaning. In the example *he eats like a pig,* characteristics such as the manner in which pigs eat are available to be used for the figurative meaning of the source domain 'pig'. Further, in their **class-inclusion model**, Glucksberg, Newsome & Goldvarg (2001) argue that often, new sub-categories are created that draw part of their meaning from their distinction from other categories. This allows irrelevant aspects of the source domain to be excluded from activation (cf. also Glucksberg 2008). For example, our example of *eating like a pig* presupposes knowing about several distinct types of eating habits. Only those specific characteristics of the pig contribute to the interpretation of the metaphor. Bowdle & Gentner (2005) critically note, however, that the metaphorical meaning of the concepts of the source domain is only created in combination with the target domain. The source domain, therefore, does not necessarily possess a metaphorical meaning apart from a concrete one. An interaction between source and target domain is indispensable, especially for innovative metaphors.

According to Giora (1999: 240), such approaches can only explain a small part of the processing of metaphors, independent from what type of access

they may postulate. In her **graded salience hypothesis**, the author Giora assumes that the level of salience plays a central role. Factors such as the level of conventionalization also determine the salience of the concrete and metaphorical meanings of words and sentences. The salient meaning of a concept is activated when a metaphor is processed, even if it is not relevant to the context. When a metaphor cannot be determined by the salient meaning of its source domain, the person consults contextual information. Giora notes that context only plays a limited role: although context can activate the correct meaning, it cannot inhibit the activation of salient, incorrect meanings. Here Giora refers to the studies of Rayner, Pacht & Duffy (1994) on eye tracking that showed participants focused longer on ambiguous words than on unambiguous words, even when provided with contextual priming for the activation of the less salient meaning. The results indicate that even though ambiguous words activate the less salient meaning, the salient meaning is always activated as well. The longer period of fixation can be attributed to the additional time required for disambiguating and reinterpreting the word.

In contrast to Giora (1999), Bowdle & Gentner's (2005) **career of metaphor theory** focuses on the development of metaphors in discourse in which the authors argue that the difference between conventional and unconventional metaphors is of primary significance, whether or not these are processed directly or indirectly. Bowdle & Gentner (2005) assume that conventional metaphors use existing metaphor categories and are, therefore, easier to process. Unconventional metaphors, on the other hand, need comparisons between source and target domain to allow their meaning to be determined. Figure 2.5 shows how the various types of metaphors require different kinds of processing, which, in turn, are associated with different levels of cognitive effort:

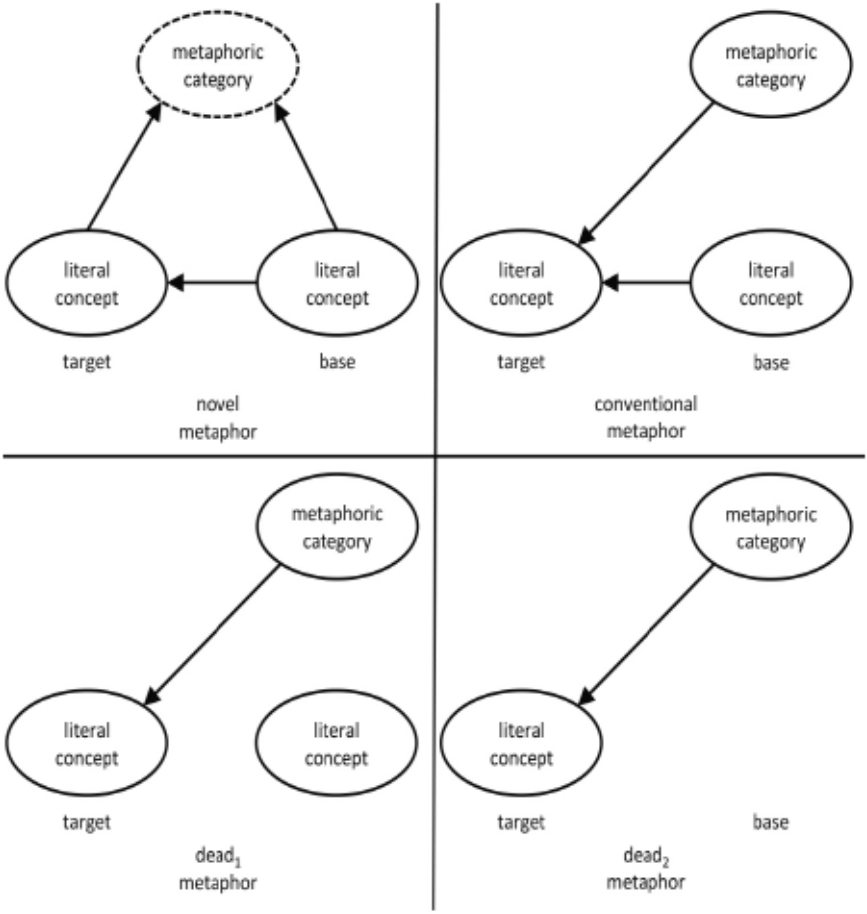


Figure 2.5: The career of metaphor according to Bowdle & Gentner (2005)

Which type of processing applies, according to Bowdle & Gentner (2005), depends on other factors such as the salience of the literal meaning (also see graded salience hypothesis according to Giora (1999) and context (see direct access view according to Gibbs 1994). The integrative character career of metaphor theory is evident in two aspects. First, after comparing the traditional comparative models (source and target domain) to determine their similarities, Bowdle & Gentner determine that their similarities are compatible with the categorization models of this theory. Second, the

different processing strategies are described in relation to the level of conventionality of metaphors (conventional, innovative, and vanished/dead metaphors).

An addition to career metaphor theory is Kövecses' (2010, 2015) approach insofar as the different levels of context are especially significant for the processing of innovative metaphors. Up to this point, most approaches limited themselves to describing the immediate linguistic context. Kövecses (2010) distinguishes between bodily experiences (space, movement, etc.) in the immediate physical environment, discourse knowledge, cultural context, and immediate social setting as well as the linguistic context itself. With innovative metaphors in particular, we try to create coherence on all levels of context. However, as context changes from one conversation to the next, metaphors also change and, therefore, can appear to us as new metaphors.

2.1.6 Interpreting Unknown Metaphors

There are several aspects of processing metaphors that become especially useful in the context of the acquisition of a new language. Similar to Giora's (1999) graded salience hypothesis, Cieślicka (2006) suggests that when learners process metaphorical expressions in a foreign/second/new language (L2), the concrete or literal meaning of individual components generally possess a higher salience and that the context is relatively important (cf. also Kecskes 2000). In light of this, Liontas (2002) proposes two phases of metaphor processing in L2: initially, the learner creates a series of hypotheses, often without the use of context, in order to interpret the metaphor. In the second phase, the learner either maintains or discards the various hypotheses depending on how compatible they are with the provided context. Littlemore & Low (2006b) found that although L2 learners utilize different strategies to interpret unknown metaphors in the second language, the success of these strategies strongly depends on the language level of the learner. Analogical reasoning, imagery, guessing from context, the use of primary metaphors from L2, and transfer from L1 are among the most common strategies which L2 learners use to interpret metaphors in the second language (cf. Azuma/Littlemore 2010, Azuma 2009). The fact that many L2 learners use the strategy of transferring from their first language to interpret metaphors in the second language and that they do so independently from their language level has led many studies to explore

the influence of the differences between metaphors in L2 and their equivalents in L1. Several studies found that L2 learners find it easier to process L2 metaphors if they are linguistically, conceptually, and socio-culturally similar to their L1 equivalents (cf. Charteris-Black 2002, Chen/Lai 2013). However, a more recent study by De Cock & Suñer (2018) showed that the socio-cultural and conceptual differences need not always cause difficulties for metaphor interpretation: together with other factors, such as context, they may interact in different ways. De Cock and Suñer assume that language users employ general knowledge about bodily experiences to process the conceptual aspects of metaphors and fall back on their knowledge of the system of values, history, and social and political structures etc., to process socio-cultural aspects. The authors found that providing context led to a significantly more precise interpretation of metaphors, especially in the context of socio-cultural differences. In terms of conceptual differences, in contrast, it resulted in significantly more inaccurate and faulty interpretations. In summary, we see that it is not only the access to the literal meaning of the source domain that is of value for processing metaphors in the L2. The use of strategies, the language level, providing context, as well as the conceptual and socio-cultural distance between metaphors in L2 and their L1 equivalents are relevant as well.

2.1.7 Metaphors in Language Teaching

Why are metaphors so important in the context of grammar teaching? Many teachers would tell you that working with metaphors is something for advanced learners and not particularly important. The Common European Framework of Reference for Languages (CEFR), which sets the standard for many language learning curricula and programs, would seem to agree with this assessment, marginally mentioning metaphors as part of the learning process only once, as part of acquiring lexical competence:

> ***Lexical elements* include:**
> a) *Fixed expressions*, consisting of several words, which are used and learnt as a whole.
> Fixed expressions include *sentential formulae*, including: direct exponents of language functions (see section 5.2.3.2) such as greetings, e.g., *How do you do? Good morning!*, etc., proverbs, etc. (see section 5.2.2.3).

b) *relict archaisms*, e.g., *Be off with you!*

c) *phrasal idioms* such as semantically opaque, frozen metaphors, e.g., He *kicked the bucket* (i.e., he died). It's a *long shot* (= unlikely to succeed) (Council of Europe 2001: 110; underlined emphasis added).

Yet, if we choose to define metaphors from a cognitive linguistics perspective, we find that metaphors are an important tool for thinking and acting which is highly relevant for beginners as well as advanced L2 learners. Littlemore, Krennmayr, Turner & Turner (2014) observed that L2 learners of all CEFR learning levels make use of metaphorical expressions, though the frequency of metaphorical expressions does increase with the more advanced language levels. They also noticed that beginners tend to use closed-class metaphoric items, such as the spatial prepositions *under* and *over* to express hierarchical relations. By contrast, learners who have reached higher learning levels (B2 and upwards) mainly use open-class items (for instance the verb 'to counter' in a discussion) (cf. Roche/Suñer 2014). All in all, metaphors seem to be present throughout the process of foreign or second language acquisition, even though we see significant differences depending on the language level. Although a scale to measure metaphoric competence has yet to be formulated, Littlemore, Krennmayr, Turner & Turner (2014) developed a list containing the most important descriptors of metaphoric competence based on their findings. Here are the descriptors they suggested for levels B1 and B2:

> B1: In addition to the above CEFR guidelines, learners should be able to use a limited number of conventional metaphors, with appropriate phraseology to present their own perspective. They should also be able to make limited use of personification metaphors. They may be starting to use a small number of metaphor clusters.
>
> B2: In addition to the above guidelines, learners should be able to make use of a limited number of conventional and creative open-class metaphors. They should be able to use metaphors for evaluative and discourse organising purposes. They should be

> starting to use personification metaphors more extensively. Metaphorical clusters are more in evidence at this level. Some are coherent, whereas others contain mixed metaphors. (Littlemore et al. 2014: 142)

The authors advocate paying more attention to metaphoric competence in instruction, as well as to using these descriptors, e.g., when evaluating written papers. Littlemore et al. suggest supporting the acquisition of metaphoric competences with appropriate teaching techniques more intensively at the B2 level since using metaphors with more expansive, open-class items begins here.

In the same vein, adequate conceptual encoding of experiences (e.g., using image schemas) is particularly an important prerequisite for highly developed language proficiency, thereby making, the acquisition of metaphoric competence a suitable primary goal of language teaching (cf. Roche 2013b, Danesi 2008, Littlemore/Low 2006b). In this context, Danesi (2008) emphasizes that successful language acquisition consists of more than mastery of the formal aspects. An understanding of culturally sensitive interactions accompanied by metaphoric extensions of denotative word meanings is also essential.

How can metaphoric competence be fostered? Azuma & Littlemore's (2010) study examines the effect of various measures meant to increase creative interactions with language as well as improving the processing and production of metaphoric expressions. In a controlled trial, the researchers compared attribute-matching training (matching shared features between source and target domain coupled with subsequent reflection) with gestalt training (encouraging holistic perception of figurative speech). The results indicate that attribute-matching training resulted in significantly improved comprehension and production of metaphorical expressions in contrast to gestalt training. The authors suggest that the attribute-matching principle makes the steps of metaphor processing steps more accessible and transparent to learners because it is, easier for them to apply metaphors to other contexts. Attribute-matching also promotes mental processes that serve as the basis for processing metaphors, such as associative processes, visual thinking, and forming analogies (cf. Littlemore/Low 2006b).

Below we illustrate how attribute-matching training as proposed by Azuma & Littlemore (2010) can be implemented in the classroom. Please notice

that a crucial aspect of this training is designing tasks so that learners are encouraged to consciously reflect on their decisions.

Experiment 2

Find out which attributes the following expression relies on and explain your reasoning: "The computer is my best friend".

Experiment 3

Which object do you associate with the following famous people: Greta Thunberg, Jacinda Ardern, Bill Gates?

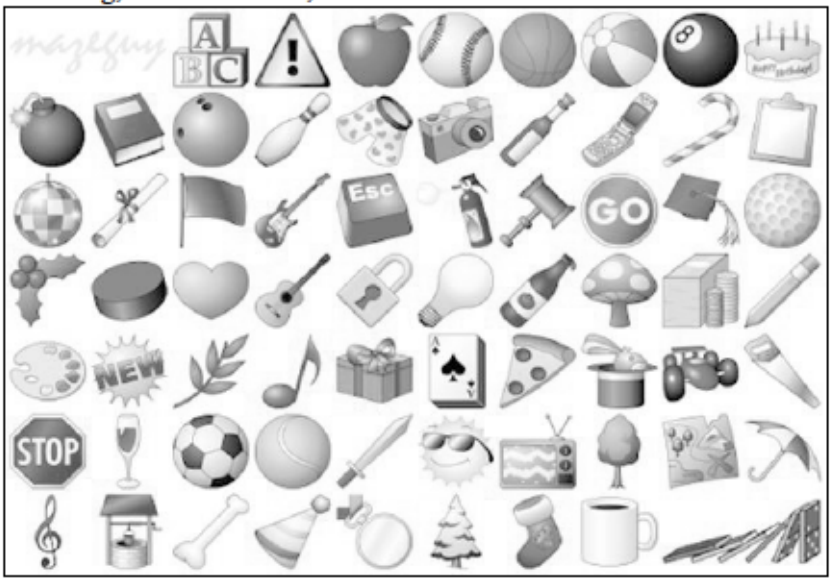


Figure 2.6: Collection of various objects (http://clipart-library.com/pictures-of-objects.html, September 2022)

Since metaphorization processes are essential to language processing, it seems logical to use language teaching to promote the development of these processes. Nevertheless, research indicates (e.g., Littlemore/Low 2006b, Low/Littlemore 2009) that metaphorization is rarely incorporated.

The only area where metaphors play a role in foreign language teaching appears to be in the teaching of vocabulary and stylistic-literary exercises.

Which techniques could learners employ if they are not familiar with certain metaphoric expressions and, therefore, cannot decode a target domain? Learners are able to understand metaphors by referring to their physical meaning. Body parts, colors, and animal names are especially productive providers of images for this purpose. A competent speaker of a language is, therefore, someone who has acquired the conceptual framework of linguistic structures and communicative procedures (cf. Kecskes/Papp 2000, Hashemian/Talebinezhad 2007). The learners are successful in a new language when they are able to acquire the conceptual system of this language through these transitional constructions. Danesi (2003), among others, attempts to describe the meaning of conceptual competence in his **conceptual fluency theory**, that is perceiving the physical and social construction of a foreign situation and being capable of adequately moving within it, without conforming to it completely (see Chapter 8.1). This ability could bring forth a new quality in terms of perception and action, often resulting in a competence to mediate between languages.

The learner can acquire the conceptual system of a foreign language by using metaphors at two levels: a paradigmatic and a syntagmatic level. The following aspects belong to the paradigmatic level:

- Metaphors constitute a conceptual system of orientation, best acquired successively and in manageable portions, depending on the learner's individual interests. Learners can build on their previously acquired knowledge of related image schemas present in many linguacultures.
- When used in foreign language teaching, metaphors are more effective the more relevant they are to learners. Image schemas and their linguistic realization should, therefore, possess the necessary salience in order to spark learners' attention. The conceptual difference between languages is one aspect that may pique learners' interest.
- This difference can exist between source and target domain or between the meanings of the L1 and L2. Unusual equivalencies such as *green with envy = gelb vor Neid* ('yellow from envy') tend to provide especially high salience.

- The increased interest affects a more intensive processing of metaphoric expressions. The increased cognitive effort leaves a more lasting impression in the cognitive system and strengthens the activation paths of the mental lexicon.
- Under certain circumstances, multimodal processing via different (sensory) channels can facilitate processing (cf. Scheller 2008, Suñer 2011).

From a syntagmatic perspective, metaphoric expressions as well as chunks are suitable for holistic, meaning-oriented processing. They also provide syntactic patterns, which generally possess a model function according to which other metaphoric expressions are shaped (such as in idiomatic expressions or collocations). The high salience and collocativity generates a high potential for internalization. As we can expect exchange and adaption processes between all the languages a learner has acquired, previously acquired language systems can also (retroactively) profit from these effects. Such effects do not appear automatically in classroom, but necessitate care and maintenance with the aid of a teacher. The following example illustrates how metaphors can be taught in class in accordance with the aspects just described. The examples are taken from the book *Für- und Widersprüche*, a textbook and German Studies reader published by Yale University Press in 1995 (Roche/Webber 1995). The contrasts between the metaphoric expressions are supposed to draw the attention of the learners and lead to long-term knowledge gains because, to a learner, they do not quite match and, therefore, create a cognitive dissonance. In doing so, learners are invited to a discovery-oriented journey of learning which includes unexpected developments and surprising realizations. Some of the choices may seem easy to them, others let them jump to conclusions, and yet others concern completely far-fetched equivalents. In others still, the learners must solve the puzzle by simply testing the compatibility of whatever combinations are left over.

Experiment 4

Please add metaphors with a similar meaning from other linguacultures. Explain how the source domain of the image schemas relates to their respective target domains. (The task is taken from Roche/Webber 1995: 60.)

to be busy as a bee	
a wolf in sheep's clothing	
to go to the dogs	
to rain cats and dogs	
be as dead as a doornail	
to be sly as a fox	
to put the fox in charge of the henhouse	
to play cat and mouse	
to buy a pig in a poke	
to smell a rat	
to let the cat out of the bag	
to act like a bull in a china shop	
to be a big shot	

How did you proceed? Where does matching appear more difficult, where does it appear easy? Where do languages differ, where do different linguacultures overlap?

Apart from the concrete matching of metaphorical and metonymical expressions in English and German, the experiment illustrates the principle of how attribute matching works. The similarities and differences between English and German can be categorized as follows:

1. In some instances, identical image schemas and lexical representations are used in both languages: *sly as a fox/schlau wie ein Fuchs sein*, *to throw in the towel/das Handtuch werfen*, *a wolf in sheep's clothing/ein Wolf im Schafspelz*. Other languages use similar source domains, possibly referring to other animals, to express similar target domains, such as slyness, capitulation, or cheating/disguise. The expressions listed above use the same structural basis (grammar).

2. In other instances, identical or conceptually related image schemas and lexical representations are used, but represented in different grammatical categories: *to play it safe* (adjective) versus *auf Nummer sicher gehen* (noun, literally: to go on number safe*)*, *to go to the dogs* versus *vor die Hunde gehen/auf den Hund kommen* (literally: go before the dogs/come to the dog), *drop in a bucket* versus *Tropfen auf den heißen Stein*, (literally: drop on the hot rock, different prepositions, differences in number), *busy as a bee* versus *bienenfleißig* (literally: beebusy, simile versus composite).

3. In some cases, different image schemas and referents referring to motion, change of place, comparison are used to express the same targets, for instance, *tempest in a teapot* versus *Sturm im Wasserglas* (literally: storm in the water glass), *big shot* versus *ein hohes Tier* (literally: a high-up animal), *a fly in the ointment* versus ein *Haar in der Suppe* (literally: a hair in the soup), *to kill two birds with one stone* versus *zwei Fliegen mit einer Klappe schlagen* (literally: beat two flies with one swat), *out of the frying pan into the fire* versus *vom Regen in die Traufe* (literally: from the rain into (under) the water spout).

4. Sometimes, the lexical referents suggest similarities between image schemas and target domains, but the relationship is misleading (so-called false friends). A *fly in the ointment* lexically corresponds

to *Fliege* in German. However, *zwei Fliegen mit einer Klappe schlagen* corresponds to *to kill two birds with one stone*. Similarly, *to be out of the woods* (*über den Berg sein*) does not refer to *auf dem Holzweg sein*, although *wood* and *Holz* are synonyms. If learners are able to decode the literal meaning, for instance in *to be over the top of the mountain*, they will also be able to match the meaning with the experience of *being out of the woods* (the worst is over).

5. Antiquated concepts (in a language, such as dead metaphors) can also be decoded by reconstructing the literal meaning and matching it to a target. For instance, *to have all bats in one's belfry* requires a notion of an old church tower which in many regions of the world is a home to a "complete" family of bats. Without them, the belfry would not be complete. Similarly, if a person does not have all their 'cups in the cupboard' (*nicht alle Tassen im Schrank haben*) something vital is missing.

The differences between the languages may seem complex in this typology. However, the intent of language teaching is not primarily to convey a typology, but mainly to give the learners insights into the conceptual content of a language and the conceptual/cognitive similarities of different languages. The goal of language teaching is also to develop and convey certain principles of equivalency, thus facilitating the learners' acquisition of a language. This is not a purely lexical or grammatical issue. Rather, this type of content-related procedure simultaneously pursues the applied teaching of cultural studies. Metaphoric expressions, after all, provide insights into a linguaculture's way of thinking, for instance, the cultural-specific constructions of images of animals. As illustrated in Experiment 4, inductive and explorative procedures are especially suitable for this teaching approach. Experiencing genuine surprise and discovery are a good indicator of learning taking place. However, we need not limit ourselves to preparatory, or rather, receptive tasks. Learners can also be motivated to follow an investigative procedure when exploring foreign cultures as well as their own linguaculture, for example when creating their own mental maps or semantic and lexical networks. Ideally, learners gain general insights into a linguaculture's way of thinking. The book *Life is like a chicken-coop ladder* by Alan Dundes (1984) serves as a bold example of such conceptual frameworks. According to Dundes, the contrastive representation of American and German idiomatic expressions, as seen above,

opens up interesting insights into the baselines of the different conceptual frameworks. It also reveals how much our language is characterized by physical taboo zones. The resulting hypothesis is that taboos lead to increasingly differentiated metaphorical expressions. Conversely, body-based metaphors tell us a lot about the actual taboos in a culture.

Using metaphorical expressions in language teaching and learning can stimulate the learners' creative productions. For instance, they can use the acquired vocabulary in their own lyrical texts, as has been long evident in the pedagogical approaches using concrete poetry. This applies to every type of language game and creative use of language, including direct metaphoric transfers from one language to another (word by word/literal translations).

2.1.8 Summary

- Even though bodily experiences and mental images are used differently in other languages, they all have the process of metaphorization in common. In this process, a certain conceptual content is projected from the source domain on to the target domain.
- Metaphors are, therefore, dynamic and productive and can prove to be an important means of expression for complex abstract circumstances in all kinds of contexts.
- In foreign language acquisition, metaphors are used as early as the beginner learning levels. They are however qualitatively and quantitatively different to those used at advanced levels of learning.
- Many factors are involved in processing metaphors. The level of conventionality and the salience of the word meanings are often decisive for the type of processing.
- The use of metaphors in foreign language classes is a worthwhile pursuit for alerting learners to intercultural differences, including the conceptual frameworks of their own languages.

2.1.9 Review Questions

1. What metaphorical expressions in other language(s) are you familiar with?
2. How can we define metaphors and what types of metaphors are there?
3. What are the most important limitations of the conceptual metaphor theory?
4. How would you define the term image schema and what examples would you give for its use in language?
5. Which factors are important for metaphor processing?
6. Why are metaphoric competences so important in foreign language acquisition?

2.2 Space and Time

This chapter revolves around space and time concepts and their linguistic expressions. We structure and organize our perception of the events that dictate our lives with the help of space and time concepts. You will, therefore, find that concepts of time are often built on **spatial metaphors**. Marking time and space is so fundamental for life that many languages stipulate obligatory markings for space (**spatiality**) and/or time (**temporality**). These markings are evident, for instance, in obligatory information on space and direction or in the tense (i.e., the temporal markings in a sentence). Concepts of time and space are so deeply intertwined in our languages that they implicate each other.

Generally, temporality concepts in languages are so **entrenched** and **conventionalized** that they are grammaticalized; the obligatory markings of temporality may not always be conceptually transparent. The relation to the historic roots of their creation is often lost. These linguistic markings dictate users how they are supposed to conceptualize the world. They also require learners to "rethink" if they are not familiar with these ways of conceptualizing. Still, the structural forms of markings are far less problematic than established concepts.

Study Goals

By the end of this chapter, you will be able to:

- understand how concepts of space and time relate to each other and how they are culture-specifically implemented in languages
- understand arguments in favor of a semantic, functional, and pragmatic representation of grammar alongside a more formal representation
- explain grammatical temporal expressions (specifically tenses) in light of cultural-specific and concrete spatial experiences in a temporal-semantic, functional and pragmatic fashion.

2.2.1 Relations of Time and Space

Time and space are present in most instances of communication. When we speak, write, or speak in our minds, we do so in a specific situation: A situation which is located in a certainspace ("it takes place") as well as embedded in a certain time frame whit a beginning and an end. It barely matters whether these situations and their respective spaces are real or virtual, open or closed. Time and space are always present. Every learner and speaker experiences them continuously. Remarkably, we recur on concepts of time and space even in the context of new virtual spaces in outer space and in cyberspace. We are familiar with these concepts through our concrete terrestrial experience. Our language makes these concrete terrestrial means available to us (examples include *spaceship*, *station*, *chat room*, *forum*, *archive*, *libraries*, *up-/downloading*, *memory*, and *website*). Time and space can be presented and shaped with different frames and perspectives. Space can be framed in terms of size (*in the car, in the subway, under the sky, in the streets*) and organized by its vertical, horizontal and lateral (leading into the space) aspects. Space can also be conceptualized as a changeable container (*to pump up a balloon, to burst with rage*) or can relate to marking a limitation or topicalize its direction, entry or exit point (*in the room/into the room*). Space may also be **deictically** partitioned (*here - there*), alongside many other options. Every language has typical (lingua-cultural) preferences in terms of how space is framed. In addition, an individual speaker is in possession of even more differentiating options within the range offered by the respective language. Grammars often only serve to explain the formalized and fossilized state of a language, rather than the conceptual content of a language's devices and developments. The concepts, however, show many fundamental similarities between various languages. As a consequence, concepts could be very productive for teaching language and culture. In the following sections we want to show in what ways languages are often similar and what they have in common in terms of the concepts of time and space. Afterwards, we explain where these shared features might have originated and how learners may tackle the challenge of acquiring concepts of spatiality and temporality when learning a language in an untutored way.

Experiment 1

Where is space? When is time?

Try to determine how space and time are expressed and/or implied in the following phrases:

Good Morning.

In the year 2525 …

Long time – no see.

I put it down in my calendar.

Experiment 2

Time Line

Can you see the temporal profile in that description of Algonquin Park in Ontario, Canada? Draw a "time line" and "localize" the events mentioned here according to their natural occurrence and duration. You may number them according to their natural occurrence. How would these events be organized in other languages you know?

> After the last glacier had melted back, the streams of water liberated by the melt left behind gorges, rivers and a sandy landscape on which Red Pine and White Pine flourish. Those who visit this part of the Park will have ample opportunities for camping, hiking and canoeing that will allow them to discover the intact and sometimes breathtaking natural world of the East Side of Algonquin Park. (Webber 2020:13)

How does the temporal scaffold of the text change if the tense is shifted to Past Tense in the first sentence?

> "When the last glacier melted away, the streams of water it liberated left behind gorges, rivers, and a sandy landscape on which Red and White Pine flourish."

[Solution: This sentence features the process of melting away and the almost simultaneously liberated waters that created and shaped the landscape. When you change "when" to "as", more drama is added: "As the last glacier melted away" really emphasizes the ongoing process.]

2.2.1.1 Common Features of Spatiality and Temporality

Spatiality and temporality can be classified by their dimensionality (one-, two-, three-dimensional), their vertical or horizontal orientation, and their form (linear, cyclical). For example: *at this moment/at the door*, *in the afternoon/wait in a line*, *on my birthday/on the shelve* (cf. Radden 2011: 3). Such examples can be found in many languages. In the Samoan language the *day before yesterday* is equivalent to *the day behind yesterday* (*talaatu ana-nafi*) and *the day after tomorrow* is equivalent to *the day behind tomorrow* (*talaatu taeao*) (Mosel according to Radden 2011: 28). It is not surprising, therefore, that spatial movements and boundary crossings have their counterparts in temporality (*passing time, the upcoming holiday, entering the new year*). Naming a location implies that it happened at a certain time, naming a time implies that it happened at a certain place (*at 3 o'clock, at school*). However, it is up to the speakers, within the options of their language, which aspect or perspective of spatiality and temporality they choose.

These linguistic perspectivations are the result of conceptual profiling (**construal**). In German and English, certain spatial events are perceived as a container (*im Regen, in the rain*), while in Roman languages, Russian and Arabic the conceptual base is an area such as an umbrella or a roof (*bajo la lluvia, sous la pluie,* literally: *under the rain*). In English, the progressive form (*going to, eating*) is important. In German, it is the aspect of the closure or non-closure of various events in the past, namely the difference between the simple past (Präteritum) and the present perfect (Perfekt). In French repetitive events (iterativity) versus singularity are important perspectives offered by the conceptual system of that language. Accordingly, iterativity in past tenses is expressed by the imparfait, singularity is expressed by the passé simple. Time is conceptualized as a linear (spatial) process in many cultures. Its centre is in the present, from which the observer gazes forward or backwards in time within the boundaries of his or her own referential system (**origo**, the perspective from the speaker). The sequence of time periods ensues from the outermost future allowing listeners to understand the time perspective of speakers, namely, looking forward or backward, such as in *facing hard times* or *we've got the worst behind us*. Linguists refer in these cases to **ego-aligned** (subsequent) and **ego-opposed** (contrasting) perspectives. Some other languages, such as the West African language Hausa, express temporality based on when an event took place with respect to the temporal distance from speakers. Here, the

distance from the observer is the distinguishing criterium, such that an earlier day of the week could be marked as before a later one (ego-opposed) instead of in relation to the time of speaking (Radden 2011: 19).

Radden (2011: 5) describes how temporal events may also be vertically organized. This is sometimes the case in Asian languages, but parallels are also to be found in English and other Indo-European languages: *Christmas is coming up, on top of things to do*. Radden notes that in Mandarin, they speak of *shang-ban-nian* ('upper-half-year', *first half of a year*) or *xia-ban-nian* ('lower-half-year', *the second half of a year*). In Korean, speakers say *sang-bangi* ('upper-half period') and *ha-bangi* ('lower-half period'); and in Japanese *kami-han-ki* ('up-half-period') and *shimo-han-ki* ('down-half-period'). The beginning of the month is *yue-tou* in Mandarin ('month-head/top'), the end of the month is called *yue-di* ('month-bottom'). The Korean language localizes the first, second and third part of a month as *sang-sun, jung-sun* and *ha-sun* as 'upper-', 'middle-' and 'lower-ten days'. Additionally, some languages such as Mandarin have other metaphorical variants of the markings, such as referring to earlier events as *head*. While East Asian languages always associate *up* with anteriority and *down* with antecedence/posteriority, the English language is not that consistent: *down to this day, down into the future, down the road, Rudolph the red-nosed reindeer, you'll go down in history*.

Cyclical concepts of time based on spatial concepts are more prevalent than linear concepts in many languages. Languages such as the South American language Toba use a cyclical concept of time: what is outside the field of view disappears (sets) into the direct past (to the right of the speaker) or rises in the near future (to the left of the speaker). It has been reported that speakers of Toba, and some other languages, look over their left shoulder when they refer to the future, (**left shoulder phenomenon**, Radden 2011: 12). Cyclical spatial concepts are also the root of annual and seasonal cycles, weekly and monthly cycles and repetitive hourly cycles such as those that are represented by round clocks and sometimes calendars. In combination with a linear notion of time passages which are unique and irretrievable, it results in a spiral-shaped concept of temporality with an open beginning and an uncertain ending.

2.2.1.2 The Spatiality of Time Models

Where do concepts of temporality originate? Even though there are currently no definite answers, it is striking that the concepts correspond with a series of basic spatial experiences. We can assume that the vertical conception of time so widespread in Asian languages aligns with the vertical direction of writing in these languages. Alternatively, it may stem from the river model of flowing time. In China, this model carries special importance culturally, due to the flowing pattern of the Yangtze River. As the vertical concept is also found in other languages, we can assume that the human experience of sloping hills may have had an influence (Evans 2004: 235). Or perhaps it was the basic experiences of crawling and creeping movements in which the head marks the front and is thereby similar to other forward-moving objects such as cars, ships or airplanes (Yu 1998: 111).

2.2.2 The Dimension of Temporality

Apart from its culturally specific, metaphorical conceptualization, temporality is also expressed by different implicit and explicit references. Apart from inherent semantic features such as **perfectivity** (expressing completion of an action), **iterativity** (repetition of an action) or **inchoativity** (setting in of an action), temporality also expresses functional aspects such as the difference between narrative tenses (Präteritum in German and simple past in English because they express closure/boundedness in the past) and reported time (Perfekt in German and present perfect in English because the event is not necessarily limited to the past). These concepts can be expressed in tenses such as Perfekt/Präteritum, imparfait, present perfect or lexically such as in prefixes attached to the verb as in German (*auf-*, *ver-*, *ab-* + *blühen* ('flourish, wither, fade') as a type of action). The tenses express various references to point of event, point of reference and point of speech. An utterance such as *Che has ridden through South America on his motorbike* marks a certain, unspecified but known time of reference situated in the past (*the year 1945*) and its potential limitlessness just as it marks the point of speech to be apart from the time of event (for instance *just now*). An utterance such as *Der Professor hat gesagt, Che ist... gefahren* (The professor said that Che drove...) marks an additional point of ref-

erence of the event. These referential aspects should be considered in language classes and language acquisition if language teaching is to be culturally sensitive.

In traditional foreign languages classes, however, expressions of time are generally reduced to lexical and formal aspects. Teachers discuss the functions of temporality, focusing on words and phrases that are necessary for expressing temporal relations: *yesterday, today, tomorrow, one week ago, in one hour, always, a day, a month, a year, 1 PM, 1984, an eternity*. Teachers also introduce the – usually obligatory, at least in the comonly taught European languages – grammatical markings of tenses. Still, the following queries could be highly relevant to the teaching of these (European) languages: When can temporality be marked purely lexically? Why and under what circumstances is temporality expressed explicitly? What is the difference between present perfect and simple past? What are the actual functions of tenses that constitute text? There is comprehensive literature on this topic, even if it is often controversial. Vater (2007) refers to relevant literature to present a concise representation of important points of orientation, with which the complexity of temporal language systems is explained. The following section refers to Vater's representation.

2.2.2.1 Points of Event, Reference, and Time

The term temporality subsumes all functions and linguistic means expressing dimensions of time in a language, i.e., aspects of intralinguistic temporal semantics and the reference to extralinguistic reality. This concept of reality consists of points and periods of time, processes and approaches (e.g., beginning, duration, end, repetition, simultaneity, anteriority, and posteriority) and others, which we recognize as recurrent patterns (cf. Oakley 2007). Temporal relationships can be explicitly expressed by lexical means, such as adverbials, may appear via grammatical means such as tense and aspect, or may be provided implicitly, for instance through spatial expressions or situational circumstances such as the warning *Watch out!* which contains neither adverbial nor grammatical temporal markings but is still marked for time.

Temporality expressed through tenses can be determined via three criteria, according to Reichenbach's influential schema (1947):

1. **Point of speech** (S)

2. **Point of event** (E)
3. **Point of reference** (R)

The point of speech, which Klein (1994) calls time of utterance (TU), describes the reference to a point or period of time in which the utterance is produced. From there, an event (E) can take place earlier, simultaneously or later. *The vacation was nice*, therefore, means that E took place before S. A speaker could also use lexical markers for the specific time when this event took place (like adding *last year). The vacation was so expensive that I won't be able to afford one for a long time* situates the sad future prospects. S takes place before E. In the case of *I'm so happy* the two are simultaneous. The past perfect and similar tenses in other languages can express the "pre-anteriority" of an event before the point of speech. *Until the year before last, she had never been on vacation.* Point of reference (R) = the year before last, E = before, S = now. An important distinction in Klein's concepts is that of time of situation (TSit), in which the event takes place, and topic time (TT). The speaker may reference the time of situation in relation to the topic time as in: *The investigating Argentinian prosecutor was found in the bathtub. He was dead.* refers to TT (the finding) and TSit (being dead), which is a state that extends into the time of speech. According to Klein (1994) the tense marks the reference between TU and TT. The relation between TT and TSit is expressed through the marking of the aspect when language allows or deems it necessary.

2.2.2.2 Contextual Relation and Intrinsic Relation

Ehrich & Vater (1989) show that it makes sense to distinguish between **intrinsic** and **contextual reference** in the relations of E, S and R within the boundaries of Reichenbach's (1947) influential categorization model. The authors refer to the use of tenses in German but their approach can also be applied to English. The intrinsic reference concerns the relation between E and R while the contextual reference concerns the relation between R and S. In terms of intrinsic reference, present tense and simple past, therefore, coincide: E and R are simultaneous. In terms of the contextual reference of S and R, however, present tense and present perfect coincide: R is simultaneous with the point of speech. This means that the present perfect can include the point of speech in English and in German (present perfect/Perfekt) and is, in contrast to the simple past, not excluded from it. This is the reason why the simple past/Präteritum is preferred in

legal language: it refers to concluded events that cannot be potentially changed in the present (point of speech) or future.

		contextual relation	
		S, R	R < S
intrinsic relation	E, R	present (Präsens)	simple past (Präteritum)
	E < R	present perfect (Perfekt)	past perfect (Plusquamperfekt)

Table 2.2: Intrinsic and contextual meaning of German and English tenses (adopted from Vater 1997: 28)

A third relation results from the two dimensions between E and S: present perfect and simple past differ in their intrinsic and contextual meaning, as shown in the above table, but mark the same **deictic relation**: E is before S. In the past perfect tense, the logical consequence is an intrinsic relation of E before R and the contextual relation of R before S (Ehrich/Vater 1989: 119) or, according to Klein (1994: 131): "TU after TT and TT after TSit"

present perfect (Perfekt)		simple past (Präterium)
E < R	Intrinsic meaning	E, R
S, R	Contextual meaning	R < S
E < S	Deictic interpretation	E < S

Table 2.3: Deictic meaning of present perfect and simple past (adopted from Vater 1997: 28)

2.2.2.3 Functional Aspects of Temporality

Apart from the features mentioned in the last section, tenses can also assume textual and cognitive-relevant functions. They can indicate the localization and the processing of prior knowledge. In other words, they can indicate whether knowledge compensation is necessary between speaker and listener. Continuity is mostly obligatory in German and English and

though it produces redundancies, continuity marks the continuing validity of the previously established frame of temporality. Learners of foreign languages like to avoid this obligatory feature by recurring on the **principle of persistent marking** by which a linguistic marking (such as a temporal or spatial reference) is valid until it is explicitly terminated. Hence, no marking is a marking in itself.

According to Weinrich, tenses allow us to differentiate between narrated and reported worlds (Weinrich 2005). The signal *Es war einmal...* (*Once upon a time there lived...*) is an introductory formula that marks a certain type of text, in this case the fairy tale. If the same events were to be expressed using the present perfect, it would be more akin to a protocol or a report. Therefore, the most important narrative tense is Präteritum in German (simple past in English). In order to make narrations more lively, under certain circumstances, speakers of German can use the present tense and the past perfect to narrate events, which is also found in English. This we see in sports reporting and first-person narratives where the author is attempting to more closely involve the reader. Beyond that, there are regional preferences which are evident in the disappearance of the simple past in language communities in Southern Germany. This means that the referential dimensions mentioned above are not always viable.

It is astounding how much information can reside in a few small morphemes, such as the *-ed* in *lived* and the *-ing* in *living*. In the first instance, the morpheme *-ed* marks the past tense, in the second instance, *-ing* marks the progressive. At the same time, these morphemes can overlap or even cancel each other out, such as the ending *-ing* marking an adjective or a noun (*the living and the dead*). It is also notable how much information and correctives are contained in the context in order to clarify the remaining ambiguities. Not every learner will have to use the whole inventory, but concepts of temporality differ between languages and, therefore, bear a great potential for both conceptual transfers and errors.

Aside

Spatiality and Temporality in Learners' Grammars

Let's take a look at a typical contemporary grammar book, published in Great Britain and popular in German classes in many English-speaking countries. It focuses on temporality and spatiality. The book we are referring to is *Hammer's German Grammar*:

4.5 **The use of articles in time expressions**

4.5.1 **Names of months and seasons usually have the definite article**

Der April war verregnet
Wir fahren im August nach Italien
Der Frühling war dieses Jahr spät
Im Winter friert der Bach zu

The name of the months have no article after prepositions other than *an, bis zu* and *in*, see 4.5.3, or after *Anfang, Mitte, Ende*:

Es war kalt für April
Der Fahrplan gilt von Mai bis Oktober
Ender Februar hat es geschneit
Er kommt erst Anfang Mai

No article is used with these words after sein and werden, see 4.8.2c, e.g.: *Es ist, wird Sommer; Es ist Januar*, or when the name is qualified by *nächsten, letzten, vorigen, vergangenen: nächsten Oktober, letzten Herbst*.

Figure 2.7: Excerpt from *Hammer's German Grammar* on temporal expressions (Durrell/Hammer 2011: 204)

Usage in TIME EXPRESSIONS is characteristically idiomatic in all languages, involving special uses and meanings. German uses can differ quite markedly from English in the way in which various aspects of time are referred to, and particular attention is paid to these differences in this chapter, where the following aspects of time expressions are treated in detail.

- **clock times** (section 11.1)
- the **days of the week, months** and **public holidays** (section 11.2)
- dates (section 11.3)
- the use of **cases** (i.e. the accusative and the genitive) in time adverbials (section 1.4)
- the use of **preposition** in time adverbials (section 1.5)
- simple time **adverbs** (section 1.6)

Figure 2.8: Excerpt from *Hammer's German Grammar* on temporal expressions (Durrell/Hammer 2011: 71)

Hammer's German Grammar attempts to present language in its current usage contexts, including colloquial use. It addresses the English speaker and for that reason often uses an explicit or implicit contrastive approach. The excerpts above (Figures 2.7 and 2.8) revolve around the usage of temporal expressions from an implicitly anglophone perspective. The question of whether an article should be used would normally be of minor relevance, but poses a great learning obstacle for learners with English as their L1. Here, as it often does, grammar makes a direct reference to English in its representation of the tenses. The assumption is that this knowledge could offer an advantage for L1 English speakers when learning the German grammar. *Hammer's German Grammar* emphasizes the specific differences in the language systems because the authors hope it will aid learners in avoiding transfer errors.

This particular grammar book is a mixed bag of various approaches: contrastive, learner-oriented, use-oriented and working with authentic language material. At the same time, it is also a grammar book that strongly adheres to the structural shape of language and somewhat neglects functional aspects. Cognitive linguistic principles are of course not discussed.

14.1 **The German tenses: general**

14.1.1 **There are six tenses in German**

These are illustrated for the verb *kaufen* 'buy' in Table 14. 1 (see also section 12.1.1b). There are, exactly as in English:

- two SIMPLE TENSES, with a single word: the present tense and the PAST tense
- four COMPOUND TENSES, formed with AUXILIARY VERBS *haben, sein* und *werden*: the PERFECT tense, the PLUPERFECT tense, the FUTURE tense, and the FUTURE PERFECT tense.

In general, the forms and uses of the tenses in German and English are very similar, as shown in Table 14.1. For this reason this chapter concentrates on those aspects of the use of German tenses which differ significantly from those of the corresponding English tenses.

Table 14.1 illustrates the tenses of the active voice of *kaufen*. Exactly the same set of tenses are also found in the passive voice, with the same meanings, as shown in Chapter 15. This chapter only deals with the tenses of the indicative mood, which signal a fact. The subjunctive also has tense forms, but these are used in a rather different way, as explained in Chapter 16.

Table 14.1 German and English tenses

Present	ich kaufe	*I buy*
Past	ich kaufte	*I bought*
Perfect	ich habe gekauft	*I have bought*
Pluperfect	ich hatte gekauft	*I had bought*
Future	ich werde kaufen	*I shall/will buy*
Future Perfect	ich werde gekauft haben	*I shall/will have bought*

Figure 2.9: Representation of the tense system in *Hammer's German Grammar* (Durell/Hammer 2011: 183)

Learner grammar books are explicitly geared toward a learner's supposed progress or progression, which is validated by empirical studies. Instead, grammar books for language learners often refer to simplification strategies and assumptions based on the authors' teaching experiences. Grammar books often want to reduce the complexity of the tense system, that is,

the inventory of forms, to make it more transparent. Such grammars attempt to return to the communicative basics of the linguistic system, or, in this case, the expression of temporality. Grammar books for language learners typically note that temporality can be expressed in different ways: either with the same form (for instance, present tense), through adverbials (lexically) or through the context. The emphasis is, therefore, on the functions.

Experiment 3

You are leading an experiment and wish to test various learning concepts of space and time representations on your learners. Let us assume that the learners are familiar with the formal basics of the respective areas of grammar, e.g., the endings. Therefore, you could test functional procedures on teaching time and space. How do you proceed and what do you find?

2.2.3 Summary

- Linguistic forms are based on clear underlying concepts of elementary spatial and temporal domains.
- Most spatial concepts are also represented in temporal concepts.
- The concepts are based on cross-linguistic image schemata (up - down, early - late, duration), even though they exhibit language-typical perspectivations, such as those referring to openness, repetition and others.
- The salience and relevance of the structures of a target language are significant to acquisition. They are often more important than L1 structures.
- Formal aspects of the description of grammatical structures focus mainly on superficial characteristics, such as whether articles or prepositions appear in adverbials or how strong and weak verbs act. It is uncertain what effect such descriptions have on the learning of a foreign language.
- Considering metaphorical concepts of space and time from a contrastive perspective is useful for creating transparency and ensuring sustainability. Aspects of form-function can be conveyed

through representations of functions, and, in the initial phase, via chunks (cf. Chapter 3).

2.2.4 Review Questions

1. Why are space and time essential or even existential categories of our perception?
2. What is the role of a speaker's individual perspective?
3. How do lingua-cultural worldviews in terms of spatial and temporal perceptions impact linguistic realizations?
4. Explain the basic categories of Reichenbach's temporality model.
5. In what ways does Klein's model expand Reichenbach's basic model?
6. What are deictic references?

2.3 Cognitive Grammar

How is grammar represented in our minds? Do we use image-based imagination to mentally represent grammar? What might be the role of imagery in second or foreign language classes? These are the questions that this chapter concerns itself with. We will begin by discussing cognitive grammar theories and approaches that describe grammar in relation to human image-based conceptual systems. Langacker's (2008a) cognitive grammar and Talmy's (2000) cognitive semantics are important theoretical approaches in this field, and this chapter will explore their contributions to cognitive linguistics. Both approaches utilise the principles of general human perception and cognition such as imagery and metaphorization in order to explain the conceptual motivation of language and grammar. The first part of this chapter discusses what part image schemas play in conceptualizing the world and how they are reflected in language. In the second part of the chapter, we use a selection of grammatical topics as an example for analysis using image-based representations. This chapter concludes with an outlook on the potential of these approaches for foreign language teaching.

Study Goals

By the end of this chapter, you will be able to:

- explain the most important principles of conceptualization using concrete examples
- analyse various grammatical phenomena based on image schemas
- explain why image-based approaches have great potential for making grammar accessible
- incorporate these insights into your own teaching methods.

2.3.1 Grammar and Conceptualization

Image-based representations often serve to illustrate the complexities of grammar. The use of such visual tools, however, is only effective when the

image is used to make relevant aspects more transparent. Image-based representations are more cognitively entrenched in this way (cf. Scheller 2009, Roche/Scheller 2008). Before using visual tools, you should be aware of the concepts that underlie grammar and how you could introduce learners to them. Langacker's (2008a) cognitive grammar is very productive for this purpose, as it provides an image-based description of the conceptual motivations of grammar constructions. We will examine the background of this idea in what follows. Cognitive grammar, according to Langacker (2008a), shares several basic principles and premises with approaches to construction grammar and general cognitive linguistics (cf. Goldberg 1995, Croft 2001): the symbolic principle, the principle of **conceptualization,** and the principle of schematization. While we have already introduced you to these principles in Chapter 1.1, the current chapter focuses intensely on the aspect of conceptualization.

The ability to mentally construct experiences in a certain way is known as conceptualization (Evans/Green 2006, Langacker 2008a). One and the same situation can be constructed in different ways using language. For example, '*the table under the lamp*' refers to the same objects in space and time, but characterizes them differently than '*the lamp above the table*'. This means that we inhabit a certain perspective through language that is only partially determined by the features of the objective world and that represents only one of many interpretative possibilities (cf. Evans/Green 2006: 571). The ability to mentally construct experiences in a certain way is known as conceptualization (Evans/Green 2006, Langacker 2008a). Researchers use terms such as construal (Langacker 2008b) and imaging system (Talmy 2000; also cf. Clausner/Croft 1999) synonymously with the term conceptualization. In order to conceptualize, the speaker needs to make decisions in terms of the **specificity**, **focus**, **salience,** and **perspectivization** of the experience meant to be expressed. These decisions are manifested in language as different kinds of lexical or grammatical realizations.

While all of the conceptualization principles are crucial for successful communication, they are usually hidden from speakers, who are usually more focused on content. Langacker (2000: 46) illustrates this condition using the example of visual aids such as eyeglasses. Glasses are responsible for a large part of wearers' perception and determine what they can see. Despite this, the wearers of glasses are so focused on the external situation

that the eyeglasses themselves become practically invisible to them. In language teaching, it can be helpful to make visible the various options for organizing conceptual content that the 'glasses' of the target language provide. Conceptualization controls the process of formulating messages (cf. Levelt/Roelofs/Meyer 1999), and so, appropriate conceptualization must be the starting point of teaching grammar (cf. Scheller 2009). In what follows, we will examine which principles are relevant to the illustration of conceptual structures in grammar.

2.3.1.1 Salience

The notion of salience describes how we always emphasize a certain aspect or a part of the scene which becomes our centre of attention (cf. Langacker 2008a). Salience is not a one-dimensional construct, but manifests on several levels of language. Langacker (2008a) distinguishes between a base and a profile, although other authors such as Fillmore (1985) use the terminological pair concept and frame for profile and base, respectively. According to Langacker (2008a), the conceptual base (immediate conceptual setting lies within a cognitive domain, that is, the broader conceptual setting) within which profiles attain a certain meaning. Individual concepts such as 'chair leg' illustrate the difference between **base** and **profile**: a *chair leg* requires the conceptual base of the concept *chair* to be understood as such. In this case, the *chair leg* comprises a concrete profile of the conceptual base of *chair* (also cf. Langacker 2008b: 68).

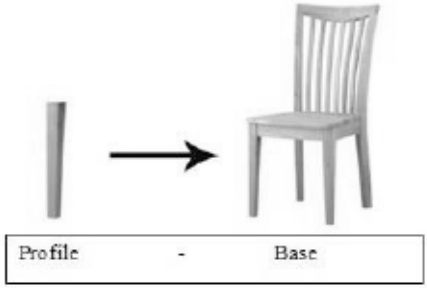


Figure 2.10: Profile and base (Möbel Ideal 2016)

At first glance, base-profile relationships do not appear to have any connection to grammar. In reality, they represent an important instrument for describing word classes, among other things. The following illustration

uses the example *to buy* to show how the conceptual base of this action can be construed either as a verbal relation between two arguments or as a noun, depending on how it is perspectivized.

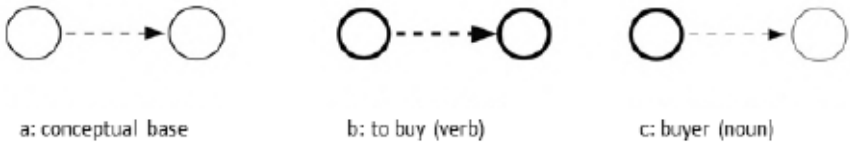


Figure 2.11: Verb (b) and noun (c) as different profiles of (perspectives on) the same conceptual base (based on Langacker 2007: 436)

When creating or using nouns or verbs we choose a certain profile of the conceptual base and specifically emphasize only a partial aspect of the entire scene. Upon hearing the word *buy*, we would generally imagine an object that is being purchased and a buyer who is purchasing it from a seller. The word *buyer*, by contrast, focuses your attention on a certain kind of agent in the buying scenario while the seller is less immediately or only implicitly present. Profiling the conceptual base as a noun leads to a completely different conceptual structure than profiling a verb perspective. Nouns profile **things**, and verbs profile **processes** (Langacker 2008a). Cognitive grammar describes noun schemas as the result of applying cognitive abilities such as grouping and reification to a base in order to form things, that have material substance and that are conceptually autonomous, independent of any event and specifically situated in a (fictional) space. Verb schemas are based on apprehending and tracking relationships as processes and describe the interactions between things (energy transfer, movement, exercising force, changing their state). Furthermore, verbs as processes have their own temporal dimension. Other word classes such as adverbs, prepositions, adjectives, infinitives, participles, etc., also describe relationships according to Langacker, though these do not express processes therefore lacking a sequential temporality. Let's look at the action verb *to present* as an example. If we wish to express this action as a temporal relation between two things, we would form a sentence such as *The new boss presented the goals for the new year*. If we wished to describe the action as conceptually autonomous, on the other hand, we would form a sentence such as *The presentation of next year's goals was very boring*.

The following diagram shows how the various word classes can be classified with respect to the distinction between things and relations as well as with respect to temporality and atemporality:

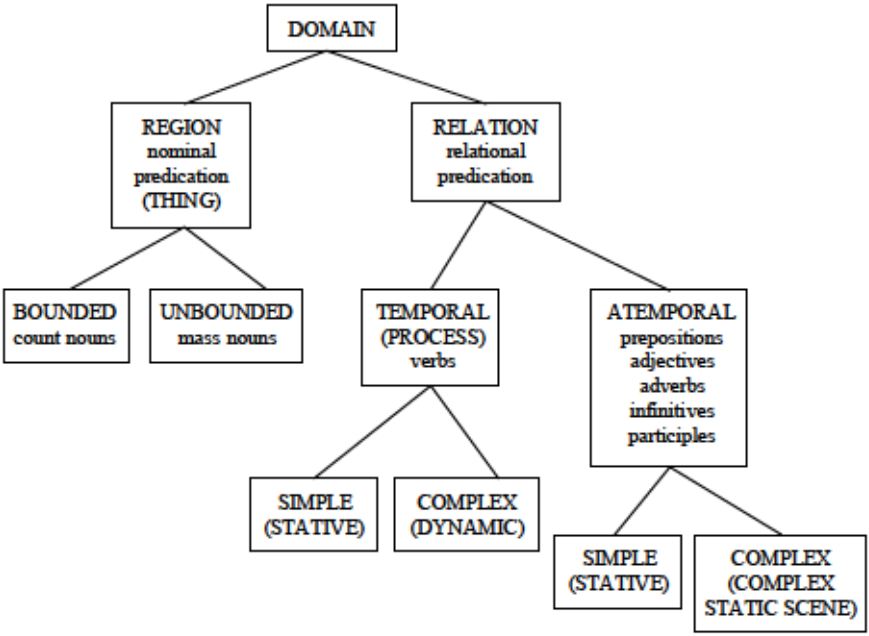


Figure 2.12: Classification of word classes according to Evans/Green (2006: 571)

The various possibilities a language has for profiling are not an arbitrary inventory of "tools" such as word formation principles, endings. Speakers use such language tools intentionally to create specific effects by focusing attention on specific aspects. Language users perceive information that is coded by nouns as cognitively more salient than information that is represented by verbs. Speakers can also choose words from open classes (nouns, verbs) to achieve a higher salience in comparison to items from closed classes such as the marking of tense or grammatical gender (cf. Talmy 2008: 29).

An additional tool of salience is probably familiar to you: you may be familiar with the following image which represents both an old lady as well as a young woman, though they cannot be perceived simultaneously (see Figure 2.13). This principle of salience is based on the findings from

perceptual psychology and is known as the **figure-ground principle** (Wertheimer 1967, Talmy 2008; also cf. trajector and landmark according to Langacker 2008a) which should not be confused with the terms base and profile.

Figure 2.13: Old lady and young woman (Brillen/Seehilfen 2016)

According to the figure-ground principle, humans always perceive one element of a scene as being in the foreground (the figure) and all other elements of the scene as being in the background. This principle of salience explains the basic grammatical categories such as subject and object. In the sentence *The ticket inspector caught a fare dodger*, the ticket inspector is the figure and the fare dodger is the ground. Intransitive sentences with prepositional objects can also illustrate such a figure-ground constellation: *Michelle Obama* (figure) *walks into Colbert's Late Show* (ground).

Experiment 1

You now have the opportunity to test how figure and ground are actually perceived. For this purpose, ask three people in your surroundings to describe the following image in one sentence:

Figure 2.14: Figure and ground (tinypic 2016)

In all likelihood, the people you asked did not produce identical utterances. Still, there are probably certain similarities in terms of determining the figure and the ground. Which element was chosen as the figure and which features do you think distinguish this figure from the ground in terms of size and recognizability?

The figures of a scene are usually the smaller, more mobile, more relevant, unexpected, and more recognizable elements (cf. Talmy 2000: 315). Language users must first perceive these elements before they can be associated with increased salience. Reapplied to language, this means that the subject (often) represents the figure and the object or prepositional object represents the ground. Syntactic roles in language are not only established by formal features such as subject-verb-congruency or declination, but are also conceptually established by the principles of general human cognition. Making learners aware of the figure-ground principle in the classroom can provide them with easier access to the new language than can primarily logical and formal descriptive parameters. Awareness of the figure-ground

principle even allows syntagmatic relations within sentences to be represtented as cross-linguistic patterns. For instance, it can be used to describe the subject function in languages such as Chinese or Japanese that do not feature subject-verb agreement (inflection) of verbs. Here, the verb always remains uninflected, independent of the subject's attributes, making it hard to characterize the subject using formal criteria. The following examples adapted from Roche & Suñer (2014: 129) illustrate further salience effects of the figure-ground principle in conjunction with other grammatical phenomena.

(1a) *The toaster is behind the coffee maker.*

(1b) *The coffee maker is in front of the toaster.*

(2a) *The coach sent Rummenigge off the field.*

(2b) *Rummenigge was sent off the field by the coach.*

(3a) *He bought a bagel before he went to work.*

(3b) *After he bought a bagel, he went to work.*

The authors describe the salience effects in these examples as follows: (1a) and (1b) use different target areas or reference points in order to situate the figure in the scene spatially. (2a) and (2b) describe a transitive action by focusing on the participants. In (2a) by using active voice, the agent, *the coach*, is in the foreground. In (2b), the passive voice demotes the coach to adjunct position, and places a stronger focus on the player, Rummenigge. Finally, the two actions in (3a) and (3b) are brought into a different focus through the use of two different temporal connectors. In (3a) the focus is on buying the bagel, and situating it temporally in relation to the (background) situation. The opposite is the case in (3b).

2.3.1.2 Perspectivization

Through our 'mental eyes', we can view experiences and scenes from different perspectives. We can choose between different concepualization possibilities, which in tum can be realized in different linguistic forms. Talmy calls this schematic system that directs us where to place our mental eyes the perspective system (cf. also vantage point by Langacker 2008b: 69; cf. Talmy 2000: 217, Langacker 2008a: 73). The use of the term perspective or perspectivization in cognitive grammar, in contrast to its

connotations in everyday language, refers to three specific dimensions of conceptualization.

For the first of these dimensions, Talmy distinguishes between the internal and the external perspective, for example *The door opened and he entered the room* (internal) and *He opened the door and entered the room* (external). The position of the speaker functions as the origo or point of perspective onto the perceived scene (cf. Talmy 2000: 69; also cf. Langacker 2008a: 75–77). This principle explains how speakers can, for instance, adopt different perspectives by assuming a progressive and non-progressive aspect (cf. Radden/Dirven 2007: 177, Niemeier/Reif 2008, Reif 2012). When speakers use a non-progressive aspect (such as the perfective aspect in languages that use it), they adopt a kind of global or external perspective. This means it is possible to perceive the point at which a process begins and/or ends (for example, *Markus talked to Mr Green*, a **bounded event** that had started and was completed). With the progressive aspect on the other hand, the speaker adopts a local or an internal perspective which focuses on a single component of the process and, therefore, blocks out the beginning and end of the process (as in *Markus was talking to Mr Green*, an **unbounded event**. We do not know when they had started talking or when (and if) they finished).

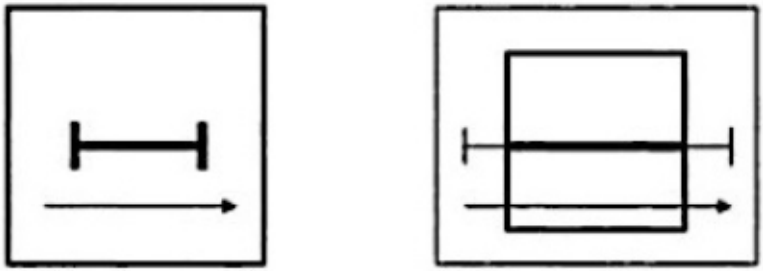


Figure 2.15: Bounded event (left) and unbounded event (right) (Radden/Dirven 2007: 178)

A second dimension of perspectivization proposed by Talmy (2000: 217) concerns different perspectival levels: the tracking camera perspective and the fixed camera perspective. For example, *There are several tunnels on the train's route* implies a fixed camera perspective. On the other hand *On this route, we will sometimes pass through a tunnel* points to a tracking perspective. An additional possibility for the camera perspective is the

changing observation of events in different locations, as in *The train goes through the forest, then goes past the lake.*

Talmy (2000: 218) also describes a third dimension of perspectivization that applies to the localization of objects. The example sentences *There is a traffic sign behind that tree* or *There is a traffic sign in front of that tree* could refer to one and the same situation. The situational placement of the traffic sign might assume different points of reference. It is evident in these examples that the figure *traffic sign* and the ground *tree* require an additional ground, namely the secondary landmark or prepositional phrase which shows where the objects are situated in space (see Langacker 2000). If the speaker is used as a point of reference, there are two additional possibilities for localizing objects (Radden 2011: 17): the **ego-aligned perspective**, where the speaker's field of view being directed backwards and forwards provides a system of reference, and the **ego-opposed perspective**, in which objects are located in space relative to the point of view of the listeners. According to Levinson (2003: 55), two more perspectives exist apart from these two **subject-centred perspectives**: the **object-centred perspective** and the **absolute perspective**. The object-centred perspective is only possible when the object of reference possesses an intrinsic front side and back side. It is easy to determine the front and back of a car, but it is impossible for a sphere. The absolute perspective is rooted in an orientation system of the environment which remains unchanged, such as the cardinal directions north, east, west, and south.

Experiment 2

Imagine that you are in Sardinia (Italy) and would like to drive to the beach by car. After searching for a parking space for 30 minutes, you finally find one (see Figure 2.16). You are not entirely sure whether parking is allowed at this spot, but others have obviously chosen to park here. How would you tell the driver to park between the black and the grey car from a subject-centred perspective? How would you do so from an object-centred perspective? Which car, if any, would you choose as a reference in either case?

Figure 2.16: Perspectivization (sardinien.com 2016)

2.3.1.3 Force Dynamics

The conceptual system of force dynamics proposed by Talmy (2000) has been used to explain numerous aspects of language. The use of kinesthetic experiences (bodily experience of physical force/resistance and movement) and somato-sensoric experiences (bodily experience of pressure and pain) to describe causality are a particular focus of this approach (cf. Evans/Green 2006: 199). Roche & Suñer (2014: 131) explain the conceptual structure of certain language areas in relation to the approach of force dynamics as follows: The sentence *The boat sunk in the lake* can be supplemented in terms of a causal force as in *The boat sunk in the lake due to a rookie mistake by the skipper* or in terms of a dynamic opposition as *The boat sunk in the lake despite being very buoyant.* Talmy transfers these interactions between force and dynamics onto psychological and social domains, among others. The rather neutral sentence *Oprah runs for president* differs substantially from the sentence *Oprah was forced to run for president*. The difference lies in the social force which affects the sentence. *Oprah* fills the role of the **agonist** in this sentence (in certain ways the 'protagonist'), a role which tends towards passivity and, therefore, resists

certain forces (**antagonists**) attempting to affect a mobilization of *Oprah* (cf. Talmy 2000: 413).

Force dynamics relations can be used to make the conceptual motivation of connectors, prepositions (concessive, causal, etc.), and modal verbs that express social and psycho-social relations transparent. In the sentence *Klopp went to the Oktoberfest despite the loss against Bayern München*, the concessive preposition *despite* expresses the following force dynamic relation: The agonist *Klopp's* tendency towards movement is stronger than the opposing force of the antagonist *the loss against Bayern*, so that the movement *to go to the Oktoberfest* cannot be stopped despite the resistance.

Aside: A Few Examples from Another Language – The Language Learner's Perspective

In the previous section we dealt with the central principles of general human perception and cognition (image schemas, metaphorization, etc.) in order to explain the conceptual motivation of language and grammar. Descriptive parameters such as profile/base and figure/ground contribute to making the conceptual motivation of many grammatical structures more transparent. To show how this can help explain topics that are difficult for language learners, this section will illustrate how the conceptual structures of two-way or two-case prepositions, modal verbs, and passive voice can be illustrated using bodily experiences and principles of general cognition. These approaches use various features of bodily experiences, such as movement in space or transfer of force, to structure and illustrate complex grammatical relations.

Two-Way Prepositions in German

The nine two-way prepositions of the German language take either the accusative or dative case, depending on the context of the sentence. Traditional grammar explains the choice of case mainly based on the item-specific meaning of the verbs (motion verbs take accusative, static verbs take dative) and applying the questions 'Where?' (Wo?, location) and 'Where to? (Wohin?, direction). However, it is immediately apparent that in authentic language usage, such explanations fall short of capturing the full picture. For instance, the dative case does appear in sentences

with motion verbs such as in the following pair of sentences: *Ich gehe in die Dusche* (I am walking into the shower, accusative) und *Ich gehe in der Dusche* (I am walking in the shower, dative). However, if we assume a conceptual motivation of the choice of grammatical case, we find that the accusative and the dative represent a different construal of the scene: if the figure traverses an imaginary boundary of the ground (*Das Auto fährt auf die Straße*, 'The car is driving onto the street', crossing from outside the street over into the street), the accusative case is used. If the figure remains within the imaginary boundaries of the ground, then the dative case is applied (*Das Auto fährt auf der Straße,* 'The car is driving on the street', staying within the boundaries of the area called 'street'). Here, the conceptual motivation of the choice of the grammatical case regarding to two-way prepositions is explained using bodily experiences (movement, changing positions) and principles of human perception (figure and ground). This provides learners an easier and more direct conceptual access to seemingly abstract grammatical rules.

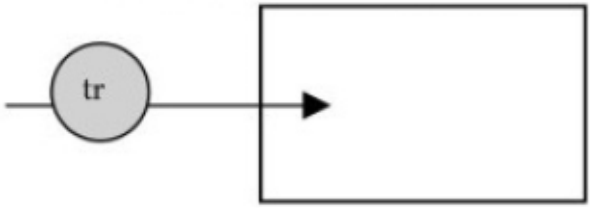


Figure 2.17: *Das Auto fährt auf die Straße,* The car is driving onto the street (based on Scheller 2009: 104)

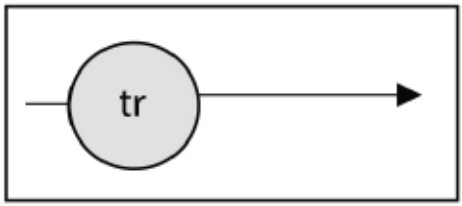


Figure 2.18: *Das Auto fährt auf der Straße,* The car is driving on (within) the street (Scheller 2009: 104)

Modal Verbs

Bodily experiences are also useful for explaining the meaning of modal verbs. This is in keeping with Sweetser (1990), Talmy (2000), and Tyler

(2008) who present different types of force dynamic relations between agonists and antagonists. Consider the following example sentences:

(1a) *Michael Fassbender has to travel quite a lot because his new movie is being filmed in many different locations.*

(1b) *Michael Fassbender should drink less, or he will have constant problems with his voice during shooting.*

(1c) *Michael Fassbender may smoke at home again after the divorce.*

The semi-modal verb *has to* in sentence (1a) is used deontically and, therefore, expresses a necessity. This necessity is subject to, in a force dynamics sense, a barely surmountable force (for instance a contract with the film company) which affects/restricts the movement of the agonist *Michael Fassbender*. Sentence (1b) acts similarly with its use of *should*. However, the external force is weaker, making the movement of the agonist less likely or necessary. In the sentence (1c) the force dynamic relations between agonist and antagonist are more complex. The deontic meaning of the modal verb *may* (permission) can also be explained from a force dynamic perspective in this sentence, by eliminating the obstacle via an external authority or force. This enables the movement of the agonist, in this case the execution of an action. From an image schema perspective and in keeping with Talmy (2000: 418), we can represent the force dynamic relationship as follows:

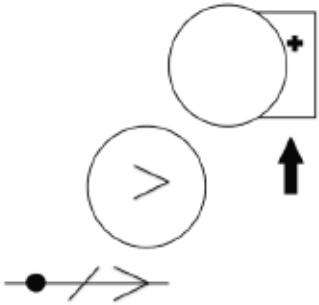


Figure 2.19: Changes in force through the elimination of the antagonist according to Talmy (2000: 418)

The image (Figure 2.19) shows the agonist *Michael Fassbender* and the first antagonist *his partner*. They are respectively represented by a circle and a curved figure. The second antagonist in the scene is represented

by the black arrow. The black dot (dormant state) and the arrow (movement) represent the possible results of the force dynamic interaction. In the earlier example sentence, the intended movement of the agonist *to smoke*, is initially prevented by the insurmountable counterforce of the antagonist *his partner* (black dot on the line). The occurrence of the second antagonist *the divorce,* however, effects the elimination of the obstacle *his partner*, and so the agonist can move forward. It does not matter whether Michael Fassbender actually does or does not smoke after the elimination of the obstacle or whether he is divorced at all. Modal verbs are meant to express the necessity or the possibility of the execution of the actions.

Active and Passive Voice

The traditional approach to teaching the passive voice is often based on formal rules of transformation from active to passive. Passives are generally formed by moving the object of an active sentence to the subject position of the clause and by moving the subject of the active sentence to the end of the clause, frequently introduced by the use of 'by'. At the same time, the verb changes its form. In English it requires a form of the auxiliary verb *to be* coupled up with the past participle. However, only transitive verbs can form a passive. English grammars love the verb "hit" to illustrate the passivity of the passive voice: John and Mary were hit by X. Whereas the passive voice in English is widely believed to be restricted to written registers it is fairly common and frequent in German in both spoken and written varieties, notably in professional contexts and languages for special purposes.

As simple and easy as these transformations may appear, they are only of limited use in language teaching. Deriving the passive directly from the active suggests that the passive names the agent as a rule. However, corpus analyses of spoken as well as of written language (in German) show that this is a rarity: according to the analyses, only 18% of passive sentences name an agent (cf. Brinker 1971, Schoenthal 1967). The reason is that the use of the passive accompanies the intent to deagentivize. This is meant to enable a description of an action from the perspective of the object or the patient. Deagentivation of the subject is necessary for text types such as protocols, reports, recipes, and other types of process descriptions (cf. Weinrich 2005, Götze/Hess-Lüttich 2002). The

agent is either simply not known or generally known and, therefore, irrelevant (cf. Pape-Müller 1980). The mechanical and purely formal character of such a transformation also ignores semantic aspects (especially the conceptualization of the different saliences of the participants) and functional-pragmatic aspects (topicalization of the object, intended anonymization of the subject, implicit topic continuity of the agent, etc.).

Suñer's (2013) cognitive linguistic approach describes passive and active voices as two different conceptualizations of transitive scenes, based on the works of Langacker (2004, 2008a) and Arnett (2004). Suñer assumes the action chain as the conceptual base of transitive events (cf. Langacker 2004, 2008a). The action chain expresses a transfer of (fictitious) energy from an agent via an instrument to a partipant, who in turn experiences a change of state. The conceptual base is not always verbalized or emphasized at full length, however. Rather, the speaker makes a decision depending on the context and to what extent the individual participants of an event are relevant and need to be emphasized.

In the next step, the speaker presents the chosen participant, in accordance with the figure-ground principle, as being either in the foreground or in the background:

> In the active voice, the agent is in the foreground (figure). In the passive voice, the patient is the primary element of the scene and the agent is usually in the background (ground) or disappears completely […] without the mental representation of the scene and the corresponding energy transfer losing coherence. (Translated from Roche/Suñer 2014: 129)

Additionally, German differentiates between processual passive and statal passive: processual passive focuses on the complete change of state of the patient, while statal passive emphasizes the final state (cf. Arnett 2004).

Roche & Suñer (2014: 130) show how active, processual passive, and statal passive are different perspectivization of events that focus processes of transitive scenes in different ways. This can be illustrated as follows using the example of a champion billiard player playing a cue ball with a cue stick:

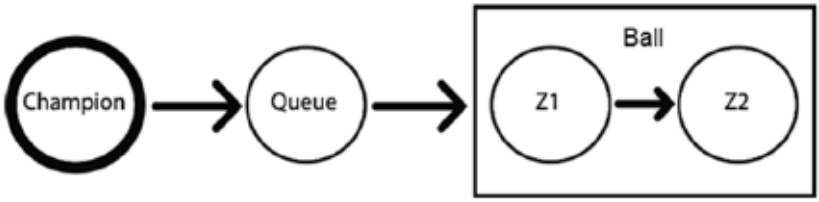


Figure 2.20: The active sentence *The champion plays the ball with the cue* (= Queue in German)

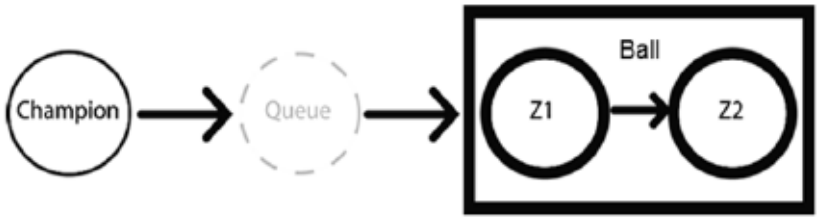


Figure 2.21: Process passive: *The ball is being played by the champion.*

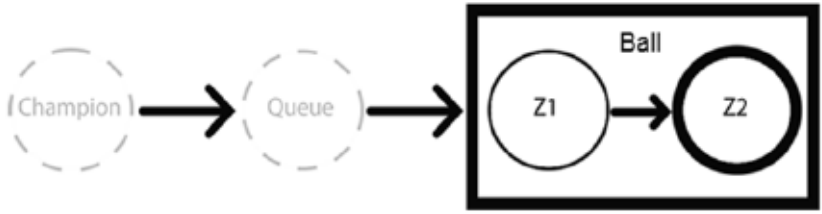


Figure 2.22: Statal passive: *The ball was played.*

Arnett & Suñer (2019) explain the diagrams as follows:

> In the first [diagram], *Der Champion spielt die Kugel mit dem Queue*, 'The player hits the cue ball with the cue stick', the focus on the agent in the active clause is shown by the spotlight on the player. In the second [diagram], *Die Kugel wird vom dem Champion gespielt*, 'The cue ball is being played by the player', the spotlight has moved from the player to the transfer of energy to the patient, which will cause the

> billiard ball to undergo a change of state. The third [diagram], *Die Kugel ist gespielt*, 'The cue ball was played', shows the placement of the spotlight on the end state of the billiard ball. In this clause, the agent and the instrument remain in the background. In the [fourth diagram], the difference between the active, processual passive and the statal passive is shown as individual moments or conceptualizations of the same event. (Arnett/Suñer 2019: 374–375)

2.3.2 Grammatical Metaphors in Animations

When conceptualizing and implementing multimedia learning materials it is not sufficient to merely look at superficial activity effects. Rather, it is useful to clarify questions such as 'Which linguistic and cultural viewpoint am I assuming as my basis?' or 'How do I explain language and culture to learners?' According to the cognitive linguistic framework, language constitutes a meaningful system allowing speakers to conceptualize their own experiences of the world in different ways. This means that speakers as the "conceptualizer" ought to be at the centre of linguistic communication processes. **Grammatical metaphor**s are very important here in their role as pedagogical bridges. As innovative conceptual metaphors, they use the everyday experiences of learners (such as hobbies, traffic, etc.) to make grammatical principles more transparent (cf. Roche/Suñer 2014). Based on this definition, grammatical metaphors have a pedagogical function and should, therefore, not be confused with the notion of grammatical metaphor according to Goatly (2007). In grammatical metaphors, a term is used to substitute for a common grammatical structure with a less common structure, such as the use of a noun instead of a verb in certain contexts. Roche & Suñer (2014) describe the added value of grammatical metaphors for grammar teaching as follows:

> Grammatical metaphors can make aspects of conceptual motivation relevant to learning (boundary-crossing, force dynamics, energy transfer, etc.) experienceable, without a need to recur on abstract forms of representation. The cognitive entrenchment of grammatical metaphors is an important prerequisite for attaining the desired added value, as the metaphors used would otherwise only possess a purely entertaining function without any relation

> to the learning process. (Translated from Roche/Suñer 2014: 133)

Now that we have discussed what notion of language forms the foundation of our language teaching and since the most important principles of language or grammar have become accessible for learning purposes, we turn to the methodological realization of such principles. As we have already seen, dynamics and movements are important in the description of the conceptual motivation of certain areas of grammar. A presentation of the respective grammatical metaphors using static pictures would be rather disadvantageous in these cases, as several pictures would be necessary to depict a complete sequence of motions. In a subsequent step, the learners would have to arrange the pictures in order to mentally simulate the actual movement or event. Possible split attention effects (cf. Chapter 7.2) may cause learning-inhibiting effects due to temporally and spatially split representations of individual images of the series. Animated representations are instead well-suited for representing the sensu-motoric aspects adequately. Research literature defines animations as follows:

> We define animations as constructed pictorial display that changes its structure or other properties over time and so triggers the perception of a continuous change. Animation is distinct from video in that it is not the result of merely capturing images of the external world – rather, it is the product of deliberate construction processes such as drawing. (Lowe/Schnotz 2014: 515)

Several findings of metaphor research argue for the use of animated grammatical metaphors. According to these findings, the comprehension of metaphoric expressions is facilitated if the concrete meaning is mentally simulated (cf. Wilson/Gibbs 2007, Johansson/Falck/Gibbs 2012). Functional magnetic resonance imaging (fMRI) studies also show that many sensu-motoric aspects contribute to deducing the meaning of abstract expressions such as idiomatic phrases (Boulenger/Hauk/Pulvermüller 2009). How these animated grammatical metaphors specifically affect areas such as two-way prepositions, and to what degree their execution in the form of animated representations generates a functional value will be discussed in the following section. For this purpose, we will examine an approach to

teaching the grammar elements involved more closely and subsequently present some empirical evidence on the efficiency of the approach. Additional practical tips regarding the use of animations in the classroom will be presented in Chapter 8.

2.3.3 Empirical Evidence: An Exemplary Study

Each language uses a particular grammatical inventory to express concepts deemed to be important in that language's world view. For speakers of English, the distinction between a non-continuous and continuous action matters (*she goes* vs. *she is going*). Speakers of French make a distinction between perfective and non-perfective actions by choosing either the simple past (passé simple) or the imperfect (imparfait). For speakers of German the difference between a movement or placement in an enclosed space and a movement towards a goal matters. In order to express the conceptual difference speakers of German use so-called two-way prepositions with either the accusative or dative case. As we have seen in the previous chapter, the typical explanation given in text books regarding the choice of case in two-way prepositions claims that the movement of the verb is the most important criterion for the use of the accusative and statics for the use of the dative. Despite apparent plausibility, this approach cannot satisfactorily explain the use of the dative in sentences such as *Ich fahre auf der Straße* ('I'm driving on the street') and *Ich gehe im Flugzeug* ('I'm walking in the airplane'). Scheller addresses this problem in her work (Scheller 2009; also cf. Roche/Scheller 2008) as she develops an explanatory approach on the basis of cognitive linguistic findings. On the one hand, Scheller's approach uses the categories figure-ground and, on the other hand, incorporates the concepts of the search area (the activated part of the target domain, for example the lower part of the bed in the prepositional phrase *unter dem Bett* ('under the bed', dative) in locative expressions (cf. Langacker 2008b). With this in mind, Scheller (2009) justifies the choice of the case with the crossing or non-crossing of the imaginary boundary of the search area (ground) by the figure. In the first case, an accusative is used, while in the second the dative is used. In order to test the added value of this explanatory approach for language acquisition, the principal boundary transgression of the cognitive linguistic approach was implemented in the form of an animation and empirically evaluated in an experiment. Figure 2.23 is a screenshot of the animations: *auf der Straße*, dative: the cat does not cross the boundary of the street; *auf die Straße*, accusative: the cat

runs onto the street. Right screenshot: the correct sentence on top fits the car travelling on the road, dative, as the car does not cross the boundary of the road.

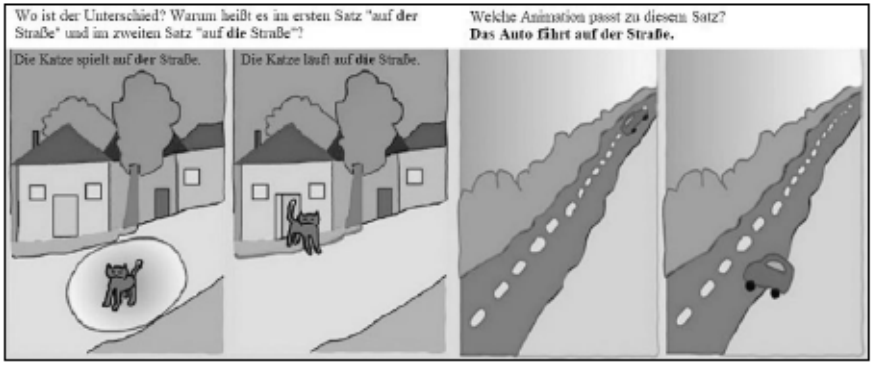


Figure 2.23: Grammar animations of two-way prepositions (based on Scheller 2012: 7)

In order to verify the added value of animations for two-way prepositions, Scheller (2009) conducted a controlled study and tested the following two variables: the explanatory approach (traditional versus cognitive linguistic) and the presentation mode (static versus dynamic) (see Table 2.4). Overall, four different groups were formed (see Table 2.4): the first group (WS) used a still version of the traditional explanation paradigm representing the dynamics with arrows, a second group (WA) used an animated version of the same traditional paradigm, a third group (GS) studied using a version with static pictures to illustrate the cognitive approach to boundary transgression, the dynamics were symbolized with arrows and the boundary as well as the target area were explicitly marked, a fourth group (GA) used an animated representation of the cognitive linguistic approach (boundary transgression).

Presentation mode/ explanatory approach	**Traditional**	**boundary transgression**
Static	WS	WS
Animated	WA	GA

Table 2.4 Research design of Scheller's study (2009)

All in all, 89 Belarussian German learners of German participated in the experiment. The first part of the experiment was a pretest, with the purpose of determining the participant's prior knowledge of two-way prepositions. Afterwards, the participating teachers worked through tasks involving the animations (about 45 minutes). Right after the learning phase, the participants were retested (about 20 minutes). In order to determine long-term learning effects, the learners were retested again one week later (for about seven minutes). The evaluation of the follow-up tests shows the group GA performing significantly better than all other groups. No marked differences were found in terms of learning performance between the three other groups. Overall, the results show that a combination of cognitive linguistic approaches and a presentation in line with multimedia principles achieves the most sustainable learning effects on grammar acquisition. In other words, this means neither animating traditional explanations of rules nor presenting the cognitive linguistic approach in the form of still pictures results in the desired added value for learning.

2.3.4 Summary

- Images and visual tools can, if they are carefully considered, be a useful medium for language teaching, by helping to explain various grammatical phenomena.
- Learners do not necessarily require elaborate linguistic explanations and rules to understand semantic and functional aspects of grammar. It would be more important and more fruitful to make language experiential. Image-based representations need to be cognitively entrenched and initiate conceptualization processes in order to attain the desired learning benefits.
- Salience is an important dimension of conceptualization. According to the salience principle, we emphasize certain aspects or partial structures of a scene when we verbalize experiences. Individual concepts (profiles) are grasped before a background of superordinate conceptual frames (bases). Consequently, there is always an element in the foreground which is referenced in relation to another element in the background.

- Furthermore, we use bodily experiences in the same way as force dynamics to conceptualize psycho-social relationships such as necessity or permission.
- Animations can help make grammar more digestible if the medium adequately reflects the conceptual nature of the grammar.

2.3.5 Review Questions

1. What does the distinction between profile and base refer to? Name concrete examples.
2. How would you explain the function of the figure-ground principle in language? Name specific examples.
3. From a force dynamics perspective how would you describe the meaning of the connector *despite* in the example sentence *The guests went to the beer garden despite the bad weather*?
4. How is the action chain connected to the active and passive voice?

3 Constructions and Chunks

Learning a foreign language often appears to be an arduous endeavour. In addition to being a difficult process for many, learners are not always successful, even when they faithfully learn all the important grammar rules. Teachers will surely have wondered why even the most eager learners are often not able to express themselves fluently, despite intensive grammar lessons. As you know, it is not enough to simply learn a few words and rules of a new language. The main challenge in communication in a foreign language is to combine words and rules correctly into meaningful sequences. This task proves to be a great challenge given the numerous differences in conceptualization between languages which requires more adequate pedagogical tools and methods. Over the past years it has been acknowledged that cognitive linguistics – and more specifically construction grammar – can offer some avenues to foster the learning of a foreign language. The construction grammar framework is holistic, it assumes complex, meaningful word sequences or constructions and regards individual lexemes as linguistic units meant to fill certain gaps in constructions. Construction grammar models make it possible to explain the connection between instantiations of a construction and its abstract form with the use of concrete examples. Moreover, construction grammar views the grammar of a language as the inventory of possible constructions. This chapter highlights the principles of this comprehensive grammar model.

3.1 Grammar as a Construction Inventory

Sabine De Knop

Whether you are an aspiring or experienced language teacher, you have probably asked yourself how you can best encourage students to be interested in vocabulary and unfamiliar structures, topics that are often considered dry or stuffy, as well as how to teach these topics efficiently. The structures taught should also be authentic and reflect actual language situations in the foreign language. Teachers are often at a loss when it comes to making decisions on which topics are relevant and how to find appealing examples. New media, such as the internet, provide a wide range of resources but are not organized systematically. The search for relevant examples often proves to be time-intensive and cumbersome. As a teacher, have you ever dreamed of having at your disposal a list of the most important constructions in a foreign language? Fortunately, construction grammar provides the possibility of compiling such lists. This chapter proposes many examples from various languages other than English. Many refer to German. The examples from languages which are new to the reader might be challenging. However, they can also serve to better illustrate the situation of a learner acquiring a new/foreign language.

Study Goals

By the end of this chapter, you will:

- be familiar with the construction grammar framework
- understand the assets of this new framework, i.e., the idea of structuring foreign language teaching around constructions rather than individual words
- recognise which constructions are important for learning, and which are less so, using examples from German.

3.1.1 Construction Grammar Models

There are two main kinds of constructionist models: **cognitive construction grammar**, and **formal construction grammar**. George Lakoff, along with Adele Goldberg (1995), is the major representative of cognitive construction grammar with his 1987 description of *there*-constructions. Lakoff's analysis of constructions as form-meaning pairs inspired Goldberg to apply this analysis to argument structure constructions. Croft (2001) later developed construction grammar into "radical construction grammar", a model based on a comparative approach that rejects syntactic relations such as subject and object, and word type categories such as verbs and nouns as abstract constructions, understanding them instead to be constituents of constructions.

Among the more formal models of construction grammar are groundbreaking contributions by Fillmore, Kay and O'Connor (1988) on the expression *let alone* as well as "fluid construction grammar" (Steels 2003), which focuses on computer-linguistic methods. Another of these models, "embodied construction grammar" (Bergen/Chang 2005), is based on the assumption that constructions result from embodied experiences. E.g., bottles, houses, and cities are often experienced as containers, and their perceived attribute of enclosing other things is expressed accordingly in language through the choice of the preposition *in* or *into*, as in *Peter pours water into the bottle* or *Lily lives in a large house in Kelowna* (cf. previous chapter on metaphors).

3.1.2 The Units of Construction Grammar

The various construction grammar models have one aspect in common, despite their differences. These models all criticize generative transformational grammar by postulating a continuum between lexicon and grammar. Goldberg's model has been greatly praised over the past few years. She presented it in her books *Constructions: A Construction Grammar Approach to Argument Structure* (1995) and *Construction at Work: The Nature of Generalization in Language* (2006). Her model often serves as a theoretical starting point for the description of the structures in a specific language. Constructions compose the basic units of a language, i.e., conventionalized form-meaning pairings: "Constructions are the fundamental units of language acquisition and reflect the most direct embodiment of learners' communicative intentions" (Ellis/Cadierno 2009: 111). Goldberg

views **non-compositionality** as a decisive feature in her first book (1995). The term indicates that the meaning of a construction cannot be derived from the meaning of individual constituents of constructions. For instance, the **caused-motion construction** expresses the meaning "X causes Y to move Z". In the famous example *Pat sneezed the napkin off the table,* the sneezing causes the movement of the napkin off the table. The meaning of the construction is so dominant that the intransitive verb *to sneeze* is used transitively in this construction. Here we see how construction grammar differs from valency theory, which postulates that the verb as the core of the sentence determines a number of arguments such as objects. By contrast, in construction grammar "the construction as a whole contributes with non-reducible aspects of meaning to the meaning of a sentence" (translated from Ziem/Lasch 2013: 21).

In Goldberg's model (1995/2006), argument structure constructions build a special class because they are the constituting elements on the sentence level. One and the same verb can contribute to the formation of different sentence structures, such as the verb *to push* in the following constructions:

(1) *Peter pushed the cart.* (transitive: agent X acts on object Y)

(2) *Peter pushed the door open.* (resultative: agent X causes object Y to become state of being Z)

(3) *Peter pushed himself to the limit.* (reflexive: agent X acts on agent X)

Goldberg describes additional constructions: the ditransitive motion construction with two objects, as in *Sally gave her sister a cake* (X causes Y to receive Z); the intransitive motion construction, as in *He sat down on the sofa* (X moves along a path Y); and the conative motion construction, as in *Jane kicked at the ball* (X targets direct action at Y). As you can see, constructions vary in their degree of complexity and abstractness. A passive construction as in *The chocolate was eaten by the children* is much more abstract than a concrete instantiation of a construction (*The children ate the chocolate*).

What we should ask ourselves is whether all these constructions exist parallel to each other, or if they are interconnected with each other as a kind of network. The next section zooms in onto this question.

3.1.3 Construction Inventory

How are all these constructions be represented in our brains? Are they stored as general rules, or are concrete examples included? The constructionist linguistic model postulates that the entirety of the constructions of a language is organized in a structured inventory. Constructions arise from generalization and schematization processes and have their own meaning, even at an abstract level. We should not regard them as isolated. Constructions are instantiations that surround abstract prototypes and are interconnected through different relations: polysemy link, metaphorical extensions, subpart link, and instance link. We will illustrate these inheritance relations with the use of several constructions with the German preposition *bis* ((up) until/(up) to). This particular preposition is often ignored in discussions on prepositions (Carstensen 2000, Cuyckens/Radden 2002, Grießhaber 2009, Lutzeier 1995, Rauh 1991, Zelinsky-Wibbelt 1993) or only described with imprecize and vague statements. On the one hand, the preposition *bis* receives a problematic special status, on the other the syntactic and semantic variation of structures with *bis* is widely overlooked. When taking a closer look at examples with *bis,* one quickly notices that the preposition is used in very different prepositional groups and constructions, as the following examples illustrate:

(4) *Der Weg bis an die Grenze ist gleich gefunden.* (DWDS Kernkorpus) (The path **to** the border will soon be found.)

(5) *Große Spieler sitzen spät bis in die Nacht.* (Cosmas II:Ioo/DEZ.75273) (Great players sit **until** late into the night.)

(6) *Ich werde dich lieben bis in den Tod.* (DWDS Kernkorpus) (I will love you **until** death.)

(7) *Der Prinz bewaffnete sich bis an die Zähne.* (DWDS Kernkorpus) (The prince armed himself **to** the teeth.)

(8) *Die Wut steht ihm bis über den Kopf.* (DWDS Kernkorpus) (His rage has risen **to** over his head.)

(9) *Wir kämpfen bis zum Sieg!* (Cosmas II: Koo/OKT.78 443) (We fight **until** victory!)

(10) *[...] Schnee bis an den See hinunter.* (Cosmas II: Aoo/MAR.16 690) (… snow down **to** the lake)

This short list is sufficient to recognize that most examples of constructions with *bis* appear together with a prepositional phrase [*bis* + PP]. In rare cases, the phrase appearing with *bis* is not introduced by an additional preposition. In these cases, the core of the phrase is either a noun without a determiner or an adverb, such as in *Wir bleiben bis Morgen* (we are staying until tomorrow) or *Bis bald!* (until soon).

The selection of the second preposition (PREP2) depends on the meaning of the ensuing noun, which defines a kind of semantic grid. In contrast to other languages (cf. Hottenroth's (2002) description of the French *jusque*), a wide range of prepositions is possible for the introduction of the prepositional phrase after the word *bis* in German: *bis an die Grenze, bis in die Nacht, bis in den Tod, bis über den Kopf, bis unter das Dach, bis hinter den Horizont, bis zum Gartentor, bis ans Knie, bis vor Jahren,* etc. Most prepositions that follow after *bis* are modal, they express a manner dimension. We can recognize a prototypical construction within this diversity that expresses a spatial meaning, either realized as a spatial path as in

(4) *Der Weg bis an die Grenze ist gleich gefunden.* (DWDS Kernkopus) (The path **to** the border is soon to be found.)

or as a spatial goal as in

(9) *Wir kämpfen bis zum Sieg!* (Cosmas II: Koo/OKT.78 443) (We fight **until** victory!).

This meaning also motivates the accusative case after PREP2, if it is a two-way preposition that allows for either the accusative or the dative to follow. Since a dynamic process along a path is expressed with motion, the accusative is favoured after PREP2.

A construction with the preposition *bis* often expresses a temporal meaning, as in

(5) *Große Spieler sitzen spät bis in die Nacht.* (Cosmas II:Ioo/DEZ.75273) (Great players sit **until** late into the night.)

The temporal meaning is grounded in the **conceptual metaphor** (Lakoff/Johnson 1980) *time is space*. It justifies the metaphoric extensions of the construction from the prototype with spatial meaning as well as the accusative case after PREP2, if it is a two-way preposition. The following example not only expresses a point in time, but also intensity:

(6) *Ich werde dich lieben bis in den Tod.* (DWDS Kernkorpus) (Literally: I will love you **until** into the death.)

Example (6) illustrates the non-compositional character of constructions (cf. Dirven/Ruiz de Mendoza Ibanez 2010: 25).

Furthermore, the construction with *bis* may also merely express intensity as in:

(7) *Der Prinz bewaffnete sich bis an die Zähne.* (DWDS Kernkorpus) (The prince armed himself **to** the teeth.)

(11) *Die Älteren sind eifrig und motiviert bis unter die Haarspitzen.* (Cosmas II: M02/FEB.10 642) (The older ones are eager and motivated **to** the hair ends.)

These examples should also be considered as non-compositional, they often contain the designation of body parts. From a cognitive linguistic perspective this is not surprising. Through the process of **embodiment** (Lakoff 2008) concrete expressions (e.g., body parts or body functions) are often used for abstract domains of experiences. Here, too, the metaphoric extension is present.

A complete description of the inventory of instantiations of constructions with *bis*, needs to encompass the combinations of the preposition *bis* with the second preposition *auf*. A construction with *bis* and *auf* is then able to express an exclusion or a limitation or a complete enclosure:

(12) *Bis auf einen haben alle Bewährungsstrafen erhalten.* (Cosmas II: RHZoo/JAN. 07 520) (**Except for** one of them, they all received probation.)

(13) *Er war nackt bis auf einen langen breiten Lendenschurz und die Mokassins.* (Cosmas II: GR1/TL1. 04547) (He was naked **except for** one long and wide loincloth and moccasins.)

The two prepositions in these examples convey the meaning of 'all except for'. The preposition *auf* is followed by a numeral adjective, such as *ein* (one). The numeral should not be confused with the indefinite article, which has the same form. The following examples, in contrast, express completion and complete enclosure:

(14) *... ist der Saal bis auf den letzten Platz gefüllt.* (Cosmas II: Aoo/JAN. 03 295) (…the hall is filled **to** the last seat.)

(15) *Wir haben den Fleck bis auf die letzte Spur entfernt* (Cosmas II: Aoo/JAN.00 484) (We removed the stain **to** the last trace.)

The disambiguation between the two interpretations can take place thanks to the larger context. In Example 12, the signifier *alle* (all) is found to designate a larger group or mass and is limited by [*bis* + PP *auf*]. According to Radden & Dirven (2007: 121) these collocations correspond to a full-set quantifier. The signifier *nackt* (naked) in example 13 metonymically expresses the notion of complete exposure. When somebody is naked it presupposes that all items of clothing were shed. In the examples 14 and 15, on the other hand, a definite article appears in front of the noun in the prepositional group, meaning that it expresses no quantification.

Experiment

Explain to a friend the use of constructions with the German preposition *bis* or choose constructions with a similar preposition in another language. What are the difficulties? How can construction grammar help explain the phenomena?

3.1.4 Summary

Constructions including the preposition *bis* are an interesting object of investigation for a number of reasons:

- They illustrate the great variation in how motion is expressed, a feature typical to the German language. This diversity does not exist in many other languages.
- Construction grammar assumes a close interconnection between language and cognition and views grammar as a cognitive construct. This cognitive construct contains and helps express the underlying conceptualizations of language. Learners can benefit from the understanding of these conceptualizations.
- Another advantage of the constructionist model is that the meanings of individual words are defined in relation to the larger sequences they appear in. Constructions are not regarded as isolated but as a part of a structured construction inventory. This section has shown how such an inventory is best suited to describe the potential uses of the preposition *bis*.

3.1.5 Review Questions

1. Which linguistic units do construction grammar models deal with?
2. How are these units defined?
3. What are the advantages of construction grammar for language teaching?
4. Compare the semantic possibilities of the preposition *bis* with its equivalents in English or another language.
5. Explain how the different instantiations with *bis* are interconnected.

3.2 The Role of Constructions in Foreign Language Learning

Sabine De Knop

Before we continue to discuss constructions, we will briefly review the historical background and discover where this interest in longer, complex sequences in language classes comes from. We also want to show to what extent the construction grammar model differs from earlier insights, as well as the benefits of the new model. There are many ways of implementing the insights of construction grammar in foreign language classes. From a constructionist grammar perspective, learning a new language means that the learner must acquire a list of conventionalised form-meaning pairings in order to construe certain events or situations (Ellis/Cadierno 2009: 125). The advantages of describing structures within the bounds of the constructionist models may be illustrated with the use of the German placement verbs *stellen, legen* and *setzen*. You have already seen, in the previous chapter, how different constructions form an inventory of structures available to speakers. The following chapter will explain how learners may be encouraged to work with structures and how these practices may be incorporated into foreign language teaching.

Study Goals

By the end of this chapter, you will:

- become familiar with earlier studies on the topic of language sequences, blueprints, etc.
- understand why it is important to deal with language units larger than individual words in foreign language classes
- recognize that constructions cannot be regarded as isolated units, but as interconnected with other constructions
- become familiar with the example of locative verbs and their role in larger constructions.

3.2.1 The Audiolingual Method

About 70 years ago, a new approach to foreign language classes emerged from structuralism and behaviorism as a countermovement to the grammar-translation method: the **audiolingual method**. Lado (1943) pioneered the method when he devised applications for British soldiers who needed to quickly learn a foreign language before their deployment in World War II. For this purpose, Lado developed lists with relevant structures (also called patterns) in the respective foreign languages. By 1961, this had resulted in a method called pattern practice. Pattern practice, mostly used in a laboratory setting, was based on the automatic repetition (and drill) of language patterns or language templates (Lado/Fries 1967). Lado and his colleague defined these language patterns as "the significant framework[s] of the sentence" (Lado/Fries 1967: XV). Lexical elements were seen as "slot-fillers" for certain positions within the same word class in a language pattern. An example of such frameworks are questions involving the auxiliary verb *do* in the English language. The learners first practice this template by hearing the structure *Do you see the train?* They then receive other lexemes such as *ship, truck,* or *car* which they are supposed to insert into the template, replacing the appropriate lexical element. Learners practice the template again and again in repetition. When learning a foreign language with pattern practice, the meaning and even the communicative function of the template are disregarded. The objective is the pure repetition of language structures in which lexical elements can replace each other in the same paradigm. The fundamental principle of this method is based on the assumption that the main structures of a foreign language are practiced regardless of whether learners know what exactly they are saying (Politzer 1961: 19). Consequently, foreign language teaching was reduced to a mechanical process of "habit formation" (Ellis 1990: 27) in accordance with behavioristic models of learning, which believed that learning occurs as an effect of imitation. Error analysis (Corder 1967) and contrastive analysis (Wardhaugh 1970 among others) were later developed based on the audiolingual method. These methods focused on those language structures which appeared to be most difficult for learners (cf. the introduction of this book for a detailed description of the history of language teaching).

It is not surprising that the method of mechanical habit formation (Ellis 1990: 27) which is based on near-automatic learning of language structures was promptly criticized (Chomsky 1959, Lenneberg 1967 among others).

The non-authentic character of the language structures presented to learners in particular prevents them from understanding, or even more significantly, producing new sentences. The communicative situations were often very abstract and non-authentic and did not intersect with the learner's everyday life. Nevertheless, audiolingual methods ultimately inspired subsequent foreign language teaching by focusing on longer patterns or dialogues.

3.2.2 Focusing on Meaningful Word Sequences

With the movement away from behavioristic views of learning, it became clear that language learning needed to be meaningful and to take place in authentic situations and with communicative goals (Nunan 1991, Widdowson 1992, Savignon 2000). It is an insight that comes from the realization that

> fluent and idiomatic control of a language rests to a considerable extent on knowledge of a body of ›sentence stems‹ which are ›institutionalized‹ or ›lexicalized‹. A lexicalized sentence stem is a unit of clause length or longer whose grammatical form and lexical content is wholly or largely fixed. […] In the store of familiar collocations there are expressions for a wide range of familiar concepts and speech acts, and the speaker is able to retrieve these as wholes or as automatic chains from the long-term memory. (Pawley/Syder 1983: 191)

Even learning vocabulary is now often understood as learning larger sequences or so-called collocations (Hausmann 1984). For the same reason, Gonzalez Rey (2013: 7) emphasizes that "Learners need to be provided with a stock of prefabricated units in order to improve their communication skills".

Depending on the approach, larger word sequences have been studied as prefabricated patterns (Wong-Fillmore 1976), collocations (Hausmann 1984), lexical phrases (Nattinger/DeCarrico 1992), formulaic language (Wray 2002), chunks (Handwerker 2008, Handwerker/Madlener 2006), or as constructions (Ellis/Cadiemo 2009, Ellis/Ferreira-Junior 2009a, 2009b, Robinson/Ellis 2008), to name only a few examples. Wong-Fillmore

(1976) is one of the first comprehensive studies on prefabricated language patterns in child language acquisition. She examined data of Spanish-speaking children learning English and concluded that prefabricated structures play a central role in language acquisition. Based on their research Nattinger & DeCarrico (1992: 114) see a number of advantages in learning a foreign language using lexical phrases. The phrases are stored as a whole and are easily accessible. Lexical phrases are imbedded in communicative situations and are, therefore, easier to retain and provide efficient ways of communicating with other students. Later, when learners have developed greater language proficiency, the phrases can be segmented into smaller meaningful units. Nattinger & DeCarrico (1992: 117) describe the next step as: "introducing the students to controlled variation in these basic phrases with the help of simple substitution drills, which would demonstrate that the chunks learnt previously were not invariable routines, but were instead patterns with open slots".

3.2.3 Abstract Constructions and Instantiations

Goldberg's constructionist model (1995, 2006) is also based on the idea of language patterns with open slots. However, it is the first model that postulates abstract constructions with their own meaning. The advantage of Goldberg's approach is that the learners can use their knowledge of a construction or construction principle to infer its meaning directly. The meaning of a construction as a whole is more important than the meaning of its constitutive elements. As we noted when we looked at constructions involving the German preposition *bis*, constructions are not isolated but are instead part of an interconnected inventory. Within this inventory, some constructions are **prototypes**, while others are connected to these prototypes through **inheritance relations**. Prototype constructions are often more concrete. More abstract constructions are linked to the prototype by a polysemic, metaphorical, instantiational, or subpart relationship. From a pedagogical perspective, it is advisable to teach prototypes as stable examples first, before turning to metaphorical extensions. By organizing constructions around a prototype, we can greatly reduce the number of exceptions that need to be included while explaining the systematic attributes of language structures.

Even when learners have acquired a series of **constructional patterns**, this does not automatically mean that they are able to actively and creatively

produce constructions and their instantiations. The decisive question in foreign language teaching and learning is how the use of constructions can be practiced and take place within a communicative frame. Difficulties in learning a foreign language typically result from linguistic and conceptual differences between the first language and the foreign language: "[…] the categorisation systems that we build up due to our L1 cause us to form habits that are hard to break when we encounter a different language with different categorization systems" (Littlemore 2009: 29). This means that learners need to reorient their attention and be aware of the conceptual and linguistic aspects that are relevant in the foreign language and of the conceptual differences between their L1 and the foreign language. Roberson (2005: 66) claims that "a critical component on any category learning is selective attentional weighting of salient dimensions". This is reminiscent of Schmidt's (1990, 2001) **noticing hypothesis**, which states that learners can only acquire foreign structures when they have previously consciously perceived them. We will illustrate how this can be achieved in the following examples involving German constructions with placement verbs (Gullberg 2009).

3.2.4 German Constructions with Placement Verbs

While the French language uses general verbs to express the positioning of objects and persons, such as *mettre* (put) or *placer* (place), the German language possesses a set of specific positional verbs called placement verbs (see De Knop 2016, De Knop/Gallez 2013, Fagan 1991). These include *legen* for a lying position, *stellen* for a vertical orientation, and *setzen* for a sitting position (cf. Serra Borneto 1996: 377). Further positions are expressed with verbs such as *hängen, stecken* (hang, stick), etc. French also has a series of verbs which express orientations, such as (*se*) *coucher* (lie down), (*se*) *lever/mettre debout* (put upright), (*s'*) *asseoir* (sit down), *pendre/accrocher* (hang up), *fourrer* (stick/thrust), etc. However, in contrast to German, French placement verbs are not obligatory for expressing a placement action (also see Ameka/Levinson 2007, Gullberg 2009). Consider the contrasting examples below:

(1) *a. Papa met le journal sur la table.* (Dad puts the newspaper on the table.)
b. Vati legt die Zeitung auf den Tisch. (Dad lays the newspaper (flat) on the table.)

(2) *a. Papa met le vase sur la table.* (Dad puts the vase on the table.)
b. Vati stellt die Vase auf den Tisch. (Dad sets the vase upright on the table.)

(3) *a. Papa met le bébé dans la chaise.* (Dad puts the baby in the high-chair.)
b. Vati setzt das Baby in den Kinderstuhl. (Dad sets the baby down in the highchair.)

(4) *a. Papa met le cadre au mur.* (Dad puts the picture on the wall.)
b. Vati hängt das Bild an die Wand. (Dad hangs the picture on the wall.)

Learners encounter difficulties of a quite different nature here. First, French-speaking learners must realize that in comparison to the single concept in their L1, a variety of different concepts is available in German. Littlemore (2009: 29) points out that "[t]hings become even more difficult for language learners when a concept that is divided into two broad categories in their own language is divided into, say, three categories in the target language". An asymmetry exists in how a placement is coded between the two languages (Narasimhan/Kopecka/Bowerman/Gullberg/Majid 2012: 3). Learners often react by simplifying the expressions, which means that they do not use different placement verbs (Gullberg 2009: 8).

An additional hurdle for the learner is to be able to differentiate between the orientation of objects or living beings. This is especially the case for abstract uses of these verbs. Why, for example, does the following sentence need the placement verb *setzen*?

(5) *Im Deutschen muss man ein Komma zwischen 2 Sätze setzen.* (Literally: In German, one needs to set a comma between two sentences.)

Even more difficult is the use of placement verbs in collocations or light verb constructions (cf. Eisenberg 2013) such as

(6) *in Verbindung setzen* (get in touch)

(7) *in den Vordergrund stellen* (put s.th. in the foreground)

Serra Borneto (1995) defined the problem in his description of the related posture verbs *stehen* (stand) and *liegen* (lie) as follows:

> […] locative verbs like *stehen* and *liegen* are simply devices the

> speaker uses to convey information about the orientation of the object(s) s/he is referring to in discourse. Thus, in order to decide how to characterize the position of an object, the speaker first has to set his attention on the most relevant dimension of the object and then must match it with one of the abstract spatial axes. These cognitive operations of course imply a certain amount of "schematization" which is "a process that involves the systematic selection of certain aspects of the referent scene to represent the whole, while disregarding the remaining aspects." (Talmy 1983: 225), because one particular feature of the overall shape of the object is isolated in order to determine its orientation. (Borneto 1995: 462)

Accordingly, learning a foreign language means that learners must reorient their attention and focus on various aspects of the visual scenery. Athanasopoulos (2009: 92) speaks of a "cognitive restructuring in the minds of bilinguals". Robinson & Ellis (2008) describe it as "rethinking for speaking".

The challenge this sets out for teachers is to redirect learners' attention towards these differences. It is best to begin with instances that deal with concrete positions, as illustrated by the examples above. Once students are familiar with these, teachers can introduce more abstract uses of placement verbs, such as:

(8) *Die Fliege setzt sich auf den Kuchen.* (The fly lands (literally: sits down) on the cake.)

This example provides an opportunity to discuss that the position of insects and birds is perceived as sitting in German, even if they are simply standing on their legs. An additional example could illustrate that elements of body parts are regarded as containers, e.g. the use of *setzen*, such as:

(9) *Der Chirurg setzte eine Prothese in die Hüfte.* (The surgeon placed (literally: set) a prosthesis into the hip.)

Or show a type of contact:

(10) *Er setzte seine Brille schief auf die Nase.* (He put on (literally: set) his glasses crookedly.)

(11) *Der Räuber setzte das Messer an ihre Kehle.* (The robber put (literally: set) a knife to (literally: on) her throat.)

The placement verb *setzen* can appear in even more abstract constructions when used metaphorically:

(12) *Er hat volles Vertrauen in seine Schwester gesetzt.* (He has put (literally: set) his full trust in his sister.)

(13) *Der Lehrer setzt ein Komma zwischen diese beiden Wörter.* (The teacher puts (literally: sets) a comma in between these two words.)

(14) *Hast du nicht vergessen, diesen Diskussionspunkt auf die Tagesordnung zu setzen?* (Haven't you forgotten to put (literally: set) this discussion point to (literally: on) the agenda?)

An attempt to systematize the various occurrences of these verbs is certainly useful. Extensive, prescriptive lists of characteristics are almost certain to be incomplete and difficult to grasp. For example, Gerling & Orthen (1979) provide a definition of the following attributes that German stative and movement verbs can take on: internal location, external location, posture-related position, direction-related position, position with fixed contact, and position with loose contact (1979: 64). These features are very specific and difficult to distinguish and consequently not very helpful to learners.

When searching for examples, teachers should refer to the following semantic categories shown in the table below regarding the usage of the placement verb *setzen* (the following tables are inspired by the description of German and Dutch posture verbs in De Knop/Perrez 2014):

USAGE	DESCRIPTION	EXAMPLES
Posture	To put into a sitting position	*Das Ehepaar* **setzte** *sich an den Tisch.* (The married couple sat down at the table.) *Die Mutter* **setzte** *das Baby auf die Kommode.* (The mother set the baby on the dresser.)
Location	Location of small animals (+insects)	*Das Rotkehlchen* **setzt** *sich in den Baum.* (The robin sits down in the tree.) *Die Fliege* **setzt** *sich auf den Kuchen* (The fly sits down on the cake.)
	Container	*Die Polizei* **setzte** *den Kriminellen ins Gefängnis.* (The police put the criminal into jail.) *Der Chirurg* **setzt** *eine Prothese in die Hüfte.* (The surgeon inserts a prosthetic into the hip.)
	Contact	*Er* **setzt** *die Brille auf die Nase.* (He puts on the glasses.) *Der Bandit* **setzte** *ein Messer an ihre Kehle.* (The bandit put a knife to her throat.)
Metaphorical	Container	*Er hat sein Vertrauen in seine Schwester* **gesetzt**. (He has put his trust in his sister.)
	Written text	*Der Lehrer* **setzte** *ein Komma zwischen die Wörter.* (The teacher placed a comma between the words.) *Einen Diskussionspunkt auf die Tagesordnung* **setzen**. (To put a discussion point on the agenda.)

Table 3.1: Usages of *setzen*

A systematic table which refers to the semantics and usages of a verb can also be used for other placement verbs, such as *stellen* und *legen*:

USAGE	DESCRIPTION	EXAMPLES
Posture	To place down on a base	**Stelle** *bitte die Teller auf den Tisch* (Please put the plates on the table.)
Location	Positioning something vertically when there is no specific base	**Stelle** *bitte die Teller in die Spülmaschine.* (Please put (literally: stand/put vertically) the plates into the dishwasher.)
Metaphorical	Positioning something in a canonical, fixed spatial relationship of facing or being exposed to something else	*Vor eine Entscheidung* **stellen** (To face a decision; literally: to put in front of a decision) *Vor Gericht* **stellen** (To try someone in court; literally: to put before court; to make someone face court, stand trial)

Table 3.2 Usages of *stellen*

The teacher may point out the particularity of the uses of the verb *stellen*, as verticality does not always play a primary role. What is more important in the use of the verb *stellen* is the conceptualization of a base with the element meant to be placed. It explains why a non-vertical object such as a bed is *hingestellt* (placed on its base) and not *hingelegt* (laid down).

USAGE	DESCRIPTION	EXAMPLES
Posture	To place on the side/ not on the base or proper position (+ possible horizontal orientation)	*Wo hast du meine Schuhe hin-***gelegt***?* (Where have you put (literally: laid) my shoes?) *Die Mutter* **legte** *das Baby ins Bett.* (The mother put the baby to bed; literally: lays the baby in the bed.) *Die Henne* **legt** *ein Ei.* (The hen lays an egg.)
Location	Localization of entities without dimensions	*Er hat den Ball in den Sand* **gelegt**. (He has laid the ball in the sand.)
	Geotopographical localization	*Der Nebel* **legt** *sich über die Stadt.* (Literally: The fog lays down over the city.) *Der Wind/Der Sturm* **legt** *sich.* (The wind/The storm calms down (literally: lays itself).)
Metaphorical	Abstract entities (+ possible state of rest)	*Der Streit/Die Aufregung* **legt** *sich.* (The fight/The excitement fades (literally: lays itself).) *Etwas zu den Akten* **legen**. (To put (literally: to lay) something in the files/records.)
	Scale	*Den Fokus/Den Akzent/Den Schwerpunkt auf etwas* **legen**. (To put (literally: lay) the focus/the accentuation/ the attention on something.)

Table 3.3 Usages of *legen*

It is obvious from these examples that the context of the placement verbs plays an important role. The examples also show how useful it is to describe and learn these verbs within their respective constructions.

Experiment

You want to show your students how the literal meaning of placement verbs is related to their metaphorical counterparts. To do so, you will need to conduct a small experiment. Let us take the English verb *to put* as an example. How would you organize/define the different usages of this verb in English based on the following sentences? Which meanings are metaphorical and which are not? Once you have compiled a systematic table with the different usages, ask an English learner whether they are aware of the wide range of usages of this verb. You will then see which meanings would need to be learned as next in class.

Where did you put the newspaper?

I wish you hadn't told me – it puts me in a really difficult position.

The government has promised to put more police officers on the street.

She put it very well when she described him as 'brilliant but lazy'.

They're so different, you can't even put them in the same category.

Source: https://www.macmillandictionary.com/dictionary/british/put (September 2022)

3.2.5 Summary

This chapter focused on the following topics:

- The pattern practice method originally developed decades ago in language laboratories has evolved to introducing learners to language sequences.
- The construction grammar model, which assumes that certain features of prototypical constructions are passed on to or 'inherited' by other constructions, provides new possibilities for describing constructions as a network.
- These additional possibilities were illustrated using the most common German placement verbs *setzen, stellen* and *legen*.
- Some of the usages of these German placement verbs are purely metaphorical. For example, the use of a placement verb such as *setzen* in connection with body parts is grounded in the contact metaphor, e.g., *Er setzt die Brille auf die Nase* (He puts (literally: sets) the glasses on his nose).
- Teachers can introduce advanced learners to other, more complex sequences via the choice of placement verbs. A description of semantic networks can be useful here as well.

3.2.6 Review Questions

1. Provide a rationale for the use of larger language sequences in foreign language classes.
2. Explain 2-3 scientific terms used to describe such sequences.
3. What are the assets of construction grammar for describing unknown constructions?

3.3 Chunking and Dechunking

Sabine De Knop

In the previous discussion on the uses of placement verbs, we have seen that difficulties in the learning process of a foreign language often arise from the conceptual differences between the L1 and the foreign language. Learners are further confronted with constructional difficulties. This means that it is not enough to master the various semantic readings of a verb in isolation. The students also need to learn in which specific structures these verbs can appear and which morpho-syntactic features these verbs have. As a teacher you have probably already wondered how you can best develop tasks to foster the acquisition of these specific language elements. You are also faced with the challenge of finding appropriate material (i.e., concrete exercises, simple and well-explained rules, etc.). The tables discussed previously might be a starting point, but individual lists of examples are too limited and should be supplemented with additional examples. In spite of the availability of numerous linguistic resources, foreign language textbooks often only offer lexical descriptions with simplified and unstructured sets of examples, as we will see in the following chapter.

Study Goals

By the end of this chapter, you will:

- understand the advantages of teaching constructions
- gain ideas on how certain verbs in constructions could be taught
- learn how teaching methods based on constructions are integrative methods making it possible to describe several topics simultaneously.

3.3.1 Placement Verbs in Caused-Motion Constructions

When we look at examples of placement verbs in the tables shown in the previous section, we see that most of them appear in so-called caused-mo-

tion constructions (see also Berthele 2012, Hijazo-Gascón/Cadiemo/Ibarretxe-Antuñano 2016, Lemmens 2006). Goldberg (1995) represents two levels of caused-motion constructions as seen here:

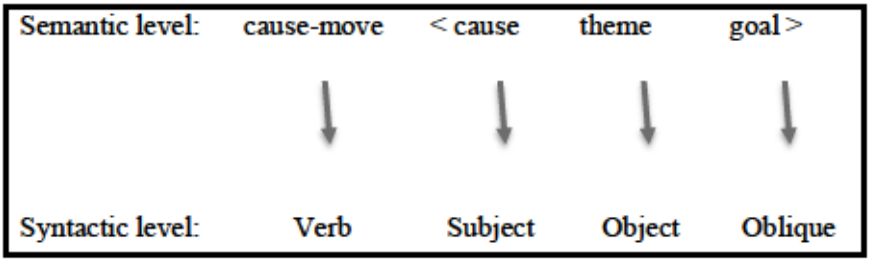


Figure 3.1: The caused-motion construction according to Goldberg (1995)

At the semantic level, this construction expresses a causation thereby naming the cause, the theme and the goal. At the syntactic level the subject expresses the cause or the agent, the object refers to a moving element, and the oblique element/adverbial names the goal of motion. Placement verbs appear in constructions such as in the following examples:

(1)	*Der Briefträger*	*steckte*	*den Brief*	*in den Kasten.*
	The mailman	*placed*	*the letter*	*in the mailbox.*
	Subject	Verb	Object	Adverbial
(2)	*Der Nebel*	*legt*	*sich*	*über die Stadt.*
	The fog	*lays down*	*('itself')*	*over the city.*
	Subject	Verb	Object	Adverbial
(3)	*Die kleine Tochter*	*stellte*	*die Teller*	*in die Spülmaschine.*
	The young daughter	*placed*	*the plates*	*into the dishwasher.*
	Subject	Verb	Object	Adverbial

The advantages of teaching placement verbs in combination with constructions lies in the integrative character which enables a simultaneous treatment of various linguistic areas and learning difficulties. Via the process of **dechunking** a teacher can point to the individual constitutive elements of the construction:

- In English, there is a tendency for one single verb to be used with a high frequency in certain types of caused-motion constructions, for example *put* in caused-motion constructions of the type verb-object-locative or *go* for the type verb-locative (cf. studies by Ellis/Ferreira-Junior 2009a, 2009b). Similarly, in German, caused-motion constructions usually contain placement verbs.
- Specific prepositions for the expression of motion appear in such constructions (Schönefeld 2006). In German, the prepositions are mostly from a group called two-way prepositions, such as *an, auf, über, in, hinter, vor,* etc. They are used either with the accusative or the dative case. When the constructions express a dynamic movement towards a goal, the accusative case is necessary.

After the teacher has presented the caused-motion construction in all its facets (typical verbs or placement verbs, correct preposition, case), the construction should ideally be practiced as a **chunk**, i.e., as a whole. Because the motion expressions are concrete, they are very suitable for a task-based approach based on concrete interactions and for **embodied learning**, a way for learners to practice new structures through bodily experiences (for the integration of situation-oriented actions and constructionist approach see Roche et al. 2012 and Chapter 8). Over the past decades embodied cognition research has substantially contributed to fostering our understanding of how sensory experiences in the physical world are linked to cognitive processes. An excellent review of research on embodied cognition is found in Skulmowski & Rey (2018; cf. also Yoon/Anderson/Lin/Elinich 2017 on embodied simulations in augmented reality environments, Müller 2017, Ladewig 2019a, 2019b and Hotze 2019 on the effects of gesture). In the context of foreign language learning and teaching, the idea of bodily engagement has also received some attention (e. g. Driver 2012, Wik/Hjalmarsson 2009). In most cases, however, instructional methods have not been consistently grounded in a theoretical framework motivated by the link between language and embodied cognition. So far, the application of insights from embodied cognition research in language teaching has led to a focusing on whether the integration of embodied experiences can facilitate access to relevant concepts of grammar that often remain hidden to learners and can replace an overemphasis on the formal aspects of grammar (Suñer/Roche 2019, Bielak/Pawlak 2011, Jacobsen 2018, Kohl-Dietrich 2016, Reif 2012, Tyler/Mueller/Ho 2011, Yasuda 2010).

For the teaching of caused-motion events different exercises are conceivable:

One type of exercise starts from a series of pictures representing a motion event, such as the short movie sequences found in Bowerman, Gullberg, Majid & Narasimhan (2004). Learners view a motion sequence and after that they are asked to express the presented situations with caused-motion constructions (also see Handwerker/Madlener 2006, Handwerker 2008).

A second type of exercise revolves around the interactive practice of the caused-motion construction. Similar to guessing games, the learners are asked to represent a caused-motion situation or a "scenario" (Di Pietro 1987). A teacher might bring along a number of objects or, alternatively, a series of images that depict such scenes and scenarios. Some students are asked to perform certain scenes non-verbally. Other students have to guess the exact caused-motion construction. Representing a certain scene helps students to practice their skills in "lifelike situations" (Di Pietro 1987: 3). As we have shown several times already, these types of situations are not a given for foreign language students as they do not generally live in the country where the foreign language is spoken. Therefore, the students get the opportunity to become "full participants in human discourse" (Di Pietro 1987: 3) by performing these exercises. Play-acting also promotes the retention of new structures. A third type of exercise can feature Playmobil® figures or any suitable toy figures. A student can use the figures to play out a caused-motion situation for the students to guess. For learning German, the correct choice of the placement verb and the appropriate case can be a central focus of this exercise.

On the basis of these suggestions, more exercises for other types of constructions may be developed.

These exercises or tasks help the learners repeat structures and practise them with a certain frequency to better retain them. According to Ellis & Cadierno (2009: 118) "frequency of exposure promotes learning". In their view, the more learners hear instantiations of constructions, the better they retain the constructions. Although, a high frequency of repeating a construction is no guarantee for effective learning. After all, classroom language learning is relatively limited, and the working memories of learners are already occupied with their L1.

3.3.2 Dechunking Exercises

When the new constructions or chunks have been practised and become familiar to learners, the teacher can provide dechunking exercises. Dechunking means breaking down chunks and constructions into constituent elements for discussion. The teacher could ask, for instance, if substituting the placement verb with another is possible.

Regarding German lessons, for example, dechunking exercises can also be applied to semantically related posture verbs such as *stehen* (to stand), *liegen* (to lie), *sitzen* (to sit), *stecken* (to stick), etc. (see Berthele 2004, De Knop 2014, De Knop/Perrez 2014) and their respective intransitive constructions, such as:

(4) *Der Ball liegt im Sand.* (The ball lies in the sand.)

(5) *Der Schmerz sitzt im Bauch.* (The pain resides in the stomach.)

(6) *Der Wagen steckt im Schlamm.* (The wagon is stuck in the mud.)

Posture verbs are etymologically and semantically linked to the respective placement verbs (see Kluge 1883, 2011), they are used in **intransitive-motion constructions**.

Goldberg (1995) represents intransitive-motion constructions as follows:

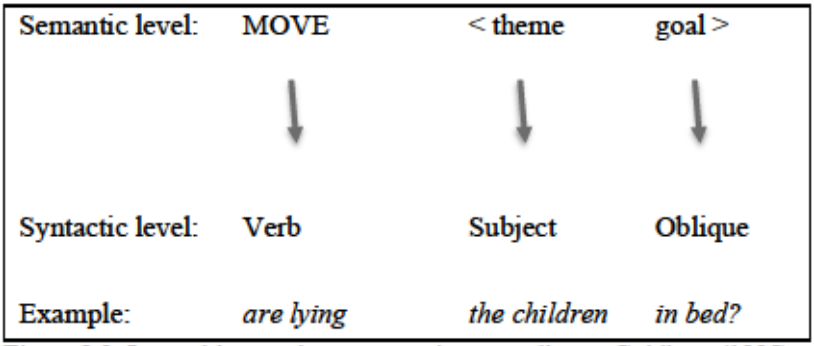


Figure 3.2: Intransitive-motion construction according to Goldberg (1995)

Through dechunking the teacher can point to the posture and placement verbs in the respective constructions and note their semantic and morphological relations. The advantage for foreign language teaching is that both constructions can be taught and learned simultaneously. It is a time-saving and efficient teaching method.

Experiment 1

You want to prepare your students for a debate about the universal healthcare program in class. Create a list of the most frequent constructions used for arguing in debates in the target language.

Experiment 2

Some teachers want to know how the principle of dechunking could be applied to some constructions containing placement and posture verbs in order to help learners create meaningful links between the different constructions. Let us take the following sentence as an example: *The government has promised to put more police officers on the street.*

Ask students to create new sentences by using the same verb in combination with other prepositions. Let them explain what happens in terms of meaning. Ideally, students should come across a few (metaphorical) meanings we discussed in the experiment from last section (e.g., *They're so different, you can't even put them in the same category*).

Source of the examples: https://www.macmillandictionary.com/dictionary/british/put

3.3.3 Summary

This chapter on teaching has illustrated why it is worthwhile to teach placement verbs within the larger frame of caused motion constructions for the following reasons:

- By embedding the placement verbs in constructions, teachers and students are able to discuss several issues, such as the choice of a specific placement verb or the appropriate preposition and the adequate case marking.
- The related intransitive-motion construction can be taught simultaneously. It utilizes posture verbs.
- Teachers can expand the themes and adjust them in accordance with learning levels. They can introduce advanced learners to light verb constructions with posture and placement verbs.

As we have seen, the description of the variation in larger sequences and the communicative situations is a promising avenue. It is also useful and of the greatest necessity to list the most important constructions in a foreign language in the form of an inventory with prototypical constructions and their instantiations (for more details, see De Knop/Gilquin 2016). We are still far from a complete realization of such an inventory, but we hope to have provided some ideas in that direction. Chapter 8 will show how the process presented above can be integrated with a consequent task-based approach.

3.3.4 Review Questions

1. How is the topic of placement verbs typically portrayed in learning materials?
2. Which constructions use placement verbs?
3. In what respect is the description of placement verbs in constructions an integrative approach?
4. What is dechunking? When is the best time to use this strategy?

4 The Multilingual Mental Lexicon

We may not be aware of it, but when we speak, we perform a great feat with every word we produce. Within less than a millisecond, we need to find the target word from our mental lexicon, the bank of our language knowledge that contains, on average, 150.000 word entries (cf. Aitchison 1997; similar also Spalek 2010). Even after locating the word, we must assemble it in the correct order, add any necessary endings, and plan the articulatory gestures for executing our message. On top of that, we must pay attention to the pragmatic aspects of communicative situations in every phase of speech production. However, handling all those tasks is not always easy for learners. A lack of concentration, for instance, can lead to slips of the tongue. Yet, it is exactly these that give us valuable insights into the mechanisms involved in successful language processing by providing evidence of how our mental lexicon is generally organized. These insights into language processing are crucial for language teaching in that they show us how, as language teachers, we can assess learners' needs and help them improve their listening, reading, speaking, and writing skills. It would be of no use for a teacher to demand a learner to repeat an incorrect word in a sentence; it would not ensure that the learner avoids making the error in later sentences. The strategies used for language teaching should be tailored towards cognitive processes to help expedite the acquisition of vocabulary, and make the search for words more efficient. With that in mind, this chapter discusses how the knowledge of language is organized within the mental lexicon and how language is processed during each individual phase. Based on that, in the second part of this chapter, we will present concrete tools and strategies for optimizing the teaching of vocabulary in new language classes.

4.1 Language Processing

How do we produce and process language? In what ways are language processes connected to the cultural aspects of communication routines? Why are the answers relevant to the practice of teaching in the first place? These are the questions we deal with in this chapter. In our search for satisfactory answers, we first explain the main phases of the language production process. The subsequent discussion of the research on verbal slips serves to illustrate the individual processes of language production. We will then describe the similarities and differences between language production and language comprehension. Afterwards, you will be introduced to a language processing model which is based on current findings and incorporates cultural specifics as well as contextual factors of language processing. These findings are relevant to the extent that they allow for the correction of learner's errors where they actually take place.

Study Goals

By the end of this chapter, you will be able to:

- recognize and describe the phases of language processing and their underlying psycholinguistic processes
- understand the specifics of language comprehension and language production processes
- provide learners with target-oriented support for language processing and identifying errors where they happen
- explain the relevance of research on language processing for teaching practice.

4.1.1 How is Language Produced?

Language processing takes place at an astounding pace. You have probably noticed many times how different tasks arise during language processing. Despite the fact that these processes primarily take place below the level of conscious awareness, we are able to quickly and appropriately react to what is happening around us. A short reaction time is essential when we want to speak (or write), as well as perceive and hear what is around us.

The input we receive influences us, as does the situation in which we find ourselves speaking or writing, and how we plan our own messages. For all these tasks, we need to find the right words, the right grammatical construction(s) and appropriate intonation (or, in the case of writing, an appropriate organization). We plan and produce language in texts and contexts, rather than syllable by syllable, word for word and sentence by sentence. Still, even as we plan our utterances, we always have to remain open to modifying them in response to changes in the interactional circumstances. When we find ourselves in such a changed situation, we might cease speaking or communicating, or we might change our way of interacting. Admittedly, different speakers respond to these challenges with varying degrees of swiftness and elegance. It is perceived as annoying, for instance, when people unwaveringly recite their messages and show no consideration for the people listening (in other words to talk somebody's ears off and chatter at them incessantly); or when the person repeats what they themselves or the other person has just said. You are probably more than familiar with situations such as these. It is also annoying speakers have habits of which they are unaware. For example, saying *no?, really?, kinda* constantly or, as is common among novice speakers always filling pauses with the word *right*. The speaker's monitor is not functioning correctly in these cases, which should normally, as with slips of the tongue, intervene and avoid these undesirable phenomena or, if they do occur, correct them.

Since normal, language production takes place at such a fast rate that planning, formulating and articulatory processes are barely perceptible. According to the model by Levelt (1999; also cf. Levelt/Roelofs/Meyer 1999), an **intention to articulate**, i.e., wanting to put something in words, is the starting point of language production. The intention to articulate triggers the activation of all relevant information in the stored knowledge stores of the speaker. Only the information that the speaker deems appropriate in consideration of the context, the situation, and the communicative goals, is selected from among the activated information. The result of this filtering process is the informational content of the message. In the next step, the information is strung together into a linear shape. Finally, the monitor modifies the original plan as necessary so that the message is suitable to the context. These processes demand the brain's nearly complete attention, so the speaker will try to automatize language processing as far as possible. We will explain the individual phases of language processing

by referring to the model proposed by Levelt (1989, 1999), as it is compatible with cognitive linguistic approaches and supported by neurolinguistic research (cf. Price 2010).

4.1.1.1 Conceptualization

The conceptualization phase of language processing is characterized by the speakers shaping their intention to speak into a preverbal message (also cf. Levelt 1989, Levelt/Roelofs/Meyer 1999). This transformation from articulatory intention to preverbal message takes place in two steps. First, speakers activate all relevant information in their prior knowledge to make a 'macroplan'. In a second step, the preverbal message is tailored to the communicative situation: the 'microplan'. Important aspects of tailoring the preverbal message are perspectivization, required either individually or situatively, as well as determining the **topic-focus structure** (see Dietrich 2007). Perspectivization is the possibility of construing the same scene differently for communicative purposes (cf. Langacker 2008b, Talmy 2000), as seen in the following examples:

(1) *The scaffold collapsed due to the strong wind.*

(2) *The strong wind caused the scaffold to collapse.*

These examples show how the way a sentence is formulated emphasizes certain elements of the overall scene. It also follows Langacker's principle of salience (2008b; cf. Chapter 2.3). In the examples above, the focus is either on the scaffold (1) or on the wind (2). Additionally, intonation can also affect the focus, even if the structure of the utterances is identical, by effectively shifting the focus to a different element of the utterance. Depending on the speaker's evaluation, the overall scene described in the following examples can be construed in different ways:

(3) *John has stolen my bag.*

(4) *John has taken my bag.*

(5) *John has accidentally taken my bag.*

The speakers also adapt the theme of their utterance to the level of the topic-focus structure, and with respect to the discourse context. The speakers or writers consider, for example, how much information is already known to the recipient, based on previous contributions or prior knowledge. Levelt (1999) claims that this is possible due to the 'discourse

record', or a type of mental archive. As we have already extensively dealt with these and other types of conceptualizations from the cognitive linguistic perspective in Chapter 2, we will not elaborate on this subject for now but rather focus on how the finished preverbal message is now passed to the **formulator** for verbal coding.

Experiment 1

The different ways a scene can be realized linguistically by various speakers shows how differently a scene may be conceptualized. You can try it for yourself in a little experiment: Without providing further contextual information, ask at least 2 or 3 people to describe the plot of the following image in just one sentence.

Figure 4.1: Scene in a restaurant

Then compare their responses. How do the descriptions differ from each other in terms of the evaluation of the scene and the emphasis on its elements? Who or what is in focus? How do the various descriptions behave in relation to specificity and perspectivization? How do the descriptions relate to each other?

4.1.1.2 Formulation and Articulation

As soon as the conceptualization phase is completed, the preverbal message is passed on from the **conceptualizer** to the formulator and subsequently equipped with a concrete linguistic form with the help of the available lexical knowledge (cf. Levelt 1989). The speakers thereby extract the required lexical knowledge from the mental lexicon in the form of **lemmata** and **lexemes**. Lemmata contain semantic and syntactic information while lexemes store grammatical information (such as phonemes, morphemes, and syllable structure) (cf. Levelt 1999). During the act of speaking, the main task of the lexicon is to supply the lemmata and lexemes of the various words with the right meaning and the right form. In order for us to understand the partial mechanisms of the formulation phase, we must consult the insights of research into slip-of-the-tongue phenomena. This field of research analyses the causes for faulty utterances and attributes them to certain (failed) partial mechanisms of language production. These sub-processes of language production can often best be singled out when a certain utterance does not take place. When considering the following example sentence with the word substitution *read* for *seen*, "*I have read four of these eight movies*" (translated from Spalek 2010: 58), we can assume that a sub-process of language production has not taken place. In this particular example, speakers incorrectly use the related content word *read* instead of the intended word *seen*. We can, therefore, conclude that conceptual information activated in this sub-process (*to see or read something*) is retained until a certain point in language production, and this can cause speakers to falsely select lexical concepts. According to Dell, Schwartz, Martin, Saffran & Gagnon (1997), the most common slip of the tongue is related to word substitution. It seems, therefore, plausible that semantic aspects are central to word search and production. An additional example is *The house has escaped from the hens*. This example features a word substitution, in which the already selected words are joined in the wrong order within the syntactic structure: *house* agrees with *has* and *hens* would require *have*. We can conclude from this example that word selection and placement into logical syntactic structures represent different sub-processes. Substituted words typically belong to the same grammatical category (noun, verb, adverb or similar). An additional type of slip is "stranding", also known as a "morpheme exchange" (cf. Dietrich 2007, Spalek 2010). In the example sentence *I'll post you keeped* the two morphemes *post* and *keep-* are substituted and adjusted accordingly. As seen in this

example, the speakers have already selected morphemes during their language production process but inserted into the incorrect placeholder of the syntactic structure since the normal sentence would read *I'll keep you posted*. Another phenomenon is "word contamination", also referred to as malapropism (cf. Dietrich 2008). In these cases, phonological processes interact with and alongside semantic and syntactic sub-processes. For example, in *Why don't you put the eggs into the bowel?* a phonologically or orthographically similar word, *bowel*, is inserted instead of the target word, *bowl*. Based on this slip, we can deduce that at a certain point in the production process, the speakers activate the articulatory features of a word before they verbally produce it. As evidenced in the example sentence, they sometimes incorrectly select words that are very similar to the target word with respect to phonological or orthographical features. Another type of slip of the tongue is called a spoonerism. This type refers to two similar phonemes which are exchanged after their activation (cf. Harley 2014: 396), as in *a bonderful wook*.

All of these slips of the tongue show how several processes play their part in formulation, which Levelt et al. (1999: 3) describe as

- lexical selection (meaning and syntax)
- morphological encoding
- phonological encoding
- phonetical encoding.

The outcome of the formulation phase is the phonetic plan of the message (Levelt et al. 1999). This plan contains exact instructions in terms of articulatory realization. Only then is the message executed in the necessary places of the articulatory apparatus in the last and final phase of language production, articulation. During the final sub-process of articulation, various regions of the neuronal system are activated in the speaker's brain, which control the articulatory execution of the phonetic plan (cf. Günther/Perkell 2004). In contrast to the conceptualization process, this phase is highly automatized and requires little or no conscious attention of speakers.

In Levelt et al.'s model (1999) the various phases and processes are depicted as modular on the one hand (the output of one phase is the input of the next phase) and incremental on the other (see Figure 4.2). Incremental means that the processes are often not completely concluded before the

next phase of the language production process begins. While this model illustrates top-down processing, it ignores bottom-up processes, such as correction from the formulator in the direction of the conceptualizer (cf. Plieger 2006).

Levelt et al. (1999) envisioned an additional component for language production for the purpose of self-monitoring or self-controlling, called the **monitor**. This component enables the self-correction of already uttered messages (**overt speech**) as well as of messages not entirely articulated, such as in the following sentence: "*We can take the mot... uh car.*" The speaker can self-correct in earlier phases of language production as well by evaluating **internal speech** (Levelt 1983) or even reconceptualizing (modifying) the preverbal message. A reconceptualization of the preverbal message takes place, for instance, when a speaker, intending to use their L2 language, adjusts the preverbal message on the level of formulation due to lexicalization difficulties, and ultimately needs to simplify their message. The simplification ensures the successful retrieval of the lexical information (see Poulisse 1993). It also shows that the monitor has access to all levels of the language production process and that it can therefore make specific corrections on different levels. Figure 4.2 shows the parallel or incremental character of Levelt et al.'s (1991) model.

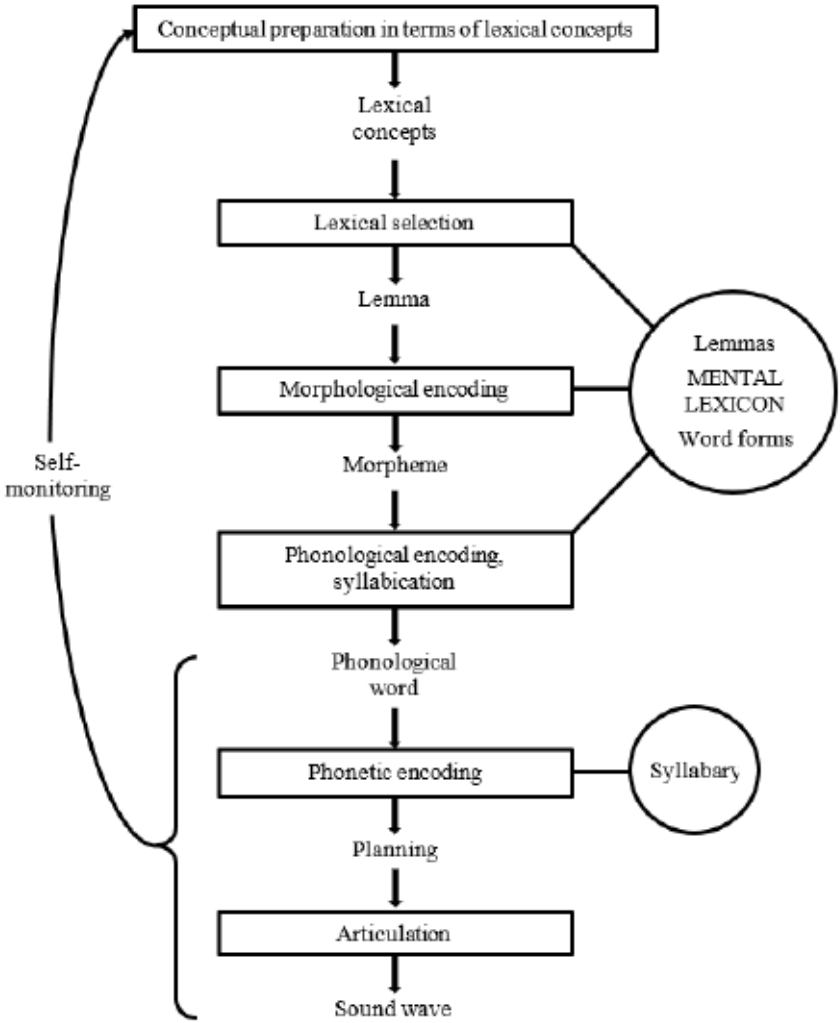


Figure 4.2: Phases of language production (according to Levelt et al. 1999: 3)

4.1.2 Language Comprehension and Production: Analogous Processes?

Up to this point, we have mainly described language processing from the perspective of language production. But what are the connections between production and comprehension? Does the listener undergo the same processes of language production in reverse order when listening to the speaker's utterances?

As mentioned earlier, our language processing apparatus includes a monitor that is equipped with certain components for perception and understanding (**parser**) (cf. Roche 2013b). With the help of our monitor, we can perceive external language and translate it into a kind of message. The listener then analyses its meaning based on his or her conceptual system. Several sub-systems are involved with the parser:

> One, a word recognition system must have access to the mental lexicon, two, a sub-system must assume the analyses of the syntactic relation between the words, and three, an additional subsystem must provide the semantic interpretation. (Translated from Roche 2013: 116)

These three processes – word recognition, syntactic analysis, and semantic interpretation – are the central focus of the following section. We will explain each of them using the appropriate approaches.

4.1.2.1 Processes of Word Recognition

To this day, comprehension in oral and written language is an area subject to intensive research. While the comprehension of both oral and written language has much in common, these two types of language comprehension differ particularly in their word recognition processes. These processes result from the different natures of the bearers of linguistic signs, in other words, sounds versus letters in alphabetic languages (cf. Kürschner/Seufert/Hauck/Schnotz/Eid 2006). Since Chapter 6 deals with reading processes (i.e., the comprehension of written language) and therefore, discusses word recognition, the current chapter will mainly describe the processing of oral language.

A relevant model for the description of word recognition processes is the **TRACE model** by McClelland & Elman (1986), based on McClelland & Rumelhart's (1981) interactive activation model and on earlier models, such as Marslen-Wilson & Tyler's (1980) cohort model. The TRACE model distinguishes between three levels of representation:

- the feature layer (acoustic input)
- the phoneme layer (prelexical)
- the word layer (lexical).

The TRACE model describes the process of word recognition as follows: In the first step, the phonetic structure is filtered out of the word's acoustic form in order to compose sound representations along with their associated distinctive features (e.g., voice participation, place of articulation, etc.). These sound representations and their features are available to the speaker as part of their mental lexicon (cf. Dietrich 2007: 211). Filtering the sounds from the acoustic event (also known as segmentation) triggers a series of vertical (bottom-up and top-down) and horizontal activation processes on three layers of word recognition. First, the distinctive features of the sound units are assigned to phonemes. Then the phonemes are joined into phoneme sequences, thereby activating the target word. During all these processes, vertically bottom-up activation processes are active, and trigger the simultaneous activation of several options at the phonemic as well as at the lexical level. At the same time, horizontally structured inhibiting processes are also at work. These processes hamper the activated phonemes throughout all layers (i.e., phoneme and word layer) if they do not conform to the features required, if for example, the phonemes include a vocalic sound. Finally, the top-down activation processes are triggered, starting at the lexical level and continuing to the prelexical level (phoneme layer) (Suñer 2011: 25).

While the TRACE model has made an important contribution to describing the factors which hamper (inhibitory) or stimulate (excitatory) the (auditory) language comprehension process, other approaches heavily criticize some of the model's premises. Suñer (2011: 25) provides an overview of the main points of criticism:

> The top-down activation process from the word to the phoneme layer [...] in competing models of auditory language comprehension (see McQueen/Norris/Cutler 1999, Norris/Ortega 2000) is not viewed as an integral part of auditory word recognition. It is excluded primarily based on the argument that word recognition does not require feedback on the lexical layer when the prelexical layer functions optimally (also compare McQueen et al. 2003). Furthermore, approaches such as the Metrical-Segmentation-Strategy (MSS) by Cutler & Norris (1988; also see Cutler/Butterfield 1992, McQueen/Norris/Cutler 1994) or the Shortlist (Norris 1994) emphasise the role of prosodic and metric features in prelexical representation. In this case, the strong syllables in accent languages such as English initiate the segmentation, because the initial syllable stands for a content word (cf. Salverda/Dahan/McQueen 2003, Spinelli/McQueen/Cutler 2003). (Translated from Suñer 2011: 25)

The models we have referenced up to this point are known as localist and should be regarded as distinct from distributional models. In localist models the units of one layer are more strongly inhibited by other units and also exhibit a higher degree of activation via horizontal processes. In contrast, distributional models postulate mixed effects of distributional lexical access (see Luce/McLennan 2005: 594). Distributional models operate on a single layer of lexical access, which houses different sets. Along the same lines, the distributed cohort model (DCM) (cf. Gaskell/Marslen-Wilson 1997) expresses the following assumptions:

1. Lexical knowledge is stored distributionally.
2. The different forms of lexical knowledge are presented in parallel form and accessed simultaneously.
3. The acoustic input depicts lexical knowledge in a direct and ongoing fashion.
4. The process of lexical access takes place with maximum efficiency.

(Gaskell/Marslen-Wilson 1997: 615)

According to the distributed cohort model, the acoustic input automatically and simultaneously activates semantic as well as phonological features,

which then will match the intended words. Only when the correct feature is filtered out of the entire network of possible, and at times competing features, can word recognition take place. It is only then that the feature pattern of the target word emerges. In contrast to the TRACE model, the DCM model does not assume a serial activation of semantic and phonological features, but instead assumes a simultaneous activation of the acoustic input.

Experiment 2

Now that you have learned quite a few things about the word recognition process, you can reconstruct it yourself with this little experiment. Read the following text out loud:

> The itnernet is spraeding fasetr and fatser. In the psat yaers, this aera has experienced rapid developemnts. Pepole possess and use a computer with intrenet accses at their palce of work as well as in their hmoes. The internet is an ideal tool for commnuication and infromation, espceially for sdutents. (Translated from Roche 2013b: 52)

As you have noticed, many of these words contain scrambled letters. Was it very difficult for you to read the text, or were you able to read it out loud without a problem? How do you explain your ability for word recognition in light of the approaches we have presented up to this point? When you consider your students' language acquisition and their environment, what kind of observations support the assumptions of the serial TRACE model, and what observations support those of the distribution and network models? What might the relevance be for language acquisition and language teaching?

4.1.2.2 Semantic and Syntactic Analysis

The interaction between semantics and syntax is the subject of several parsing theories. Strohner (2003: 524) classifies these theories based on the criterion of temporal occurrence of both analytical processes (serial vs. parallel parsing method), as well as on the criterion of autonomy (autonomous versus interactive model). Autonomous models, for example, assume

that syntax does not depend on semantics arguing that syntax possesses its very own special status. Nevertheless, the autonomous models are very distinct from each other in terms of the occurrence of semantics and syntax over time. According to autonomous-serial models (cf. the garden path model of Frazier 1978) in particular, syntax is processed ahead of semantics. Autonomous parallel models (Boland 1997), on the other hand, assume the simultaneous occurrence of both analytical processes and thereby challenge the rigid, syntax-oriented mind-set of serial autonomous models (see Strohner 2003: 525). In contrast to autonomous models, interactive models describe syntax and semantics as two processes that mutually influence each other. Some researchers also distinguish between interactive parallel (for instance Tyler/Marslen-Wilson 1977) and interactive serial approaches within interactive models (such as Altmann/Steedman 1988; also called incremental interactive approaches, see Pickering/Clifton/Crocker 2000; cf. Strohner 2003).

Autonomous models		**Interactive models**	
The processing of syntax and semantics are not dependent on each other		The processing of syntax and semantics mutually influence each other	
autonomous serial	**autonomous parallel**	**interactive serial**	**interactive parallel**
Autonomous syntactic processing before autonomous semantic processing	Autonomous syntactic and autonomous semantic processing may overlap	Syntactic and semantical processing are conditional to each other and take place one after the other	Syntactic and semantic processing are conditional to each other and take place simultaneously

Table 4.1 Models of language processing

There is no final answer to the question of which approach should be the norm. Psycholinguistic research up to this point has found empirical evidence that supports each of the four directions the approaches take (cf.

Strohner 2003, Dietrich 2007). We should, therefore, assume an integrative perspective. Since the four approaches focus on different phases and aspects of syntax processing, we consider them complementary. Altmann & Steedman (1988) for example, used **cul-de-sac effects** to demonstrate that syntax processing can also be controlled through semantics. Cul-de-sac effects appear when the result of the syntactic analysis requires correction via a subsequent semantic analysis. Researchers like to rely on this effect in order to argue for autonomous models. Altmann & Steedman (1988), however, were able to show that the cul-de-sac effect was no longer observable in ambiguous contexts. It can therefore be concluded that the onset of semantics and syntax may indeed be simultaneous so that interaction between the two can be assumed. In light of the process of text comprehension as a whole and after considering empirical findings, Christmann & Groeben (1999) argue that semantics inhabits a more important position than syntax. The reason being that syntactic information is fleeting while semantic information is available in the long term (Christmann/Groeben 1999: 157).

4.1.3 Language Processing Model

In this final section we wish to summarize the insights into language processing up to this point by using the models by Roche (2013b). According to the author (2013b: 114), the following assumptions are central to the model:

- The monitor has direct access to the entire production system. As soon as a speaker detects problems in the meaning or correctness of internal or external language, they can interrupt the continuation of the production in progress. The preverbal message is either reprocessed, or a new or different message is added (**reconceptualization**).
- The phases of language processing are, therefore, not completed one after the other. Their onset can be parallel or incremental (in modular sub-processes). The processing of an individual phase can begin before the previous one has concluded.
- The mental lexicon is central to language processing. It stores meanings, important grammatical information, different codings, and the culture-specific usages.

- Cultural specifics connect pragmatic aspects to the encyclopedic knowledge of speakers and listeners. Pragmatic and encyclopedic knowledge serve as a basis for the conceptualizer. It is barely conceivable that conceptualizing and decoding utterances could take place outside of pragmatic context, i.e., in a 'culture-free' zone.
- Conceptualization and formulation are closely related. According to Slobin's (2003) concept of "thinking for speaking", formulation is actually incorporated into the process of conceptualization. In that sense, context conceptualizations are shaped in a way that makes them compatible with language-specific coding possibilities. An example is how the difference between *Du* and *Sie* in German (*Thou* and *You*, singular) as a marker of familiarity versus formality is often not relevant in English. Nonetheless, varied differentiations in addressing another to achieve similar meanings are possible in English and often necessary.
- The fundamental influence of context and function on language production and comprehension is especially evident in the heavy use of ellipsis, anaphora, and cataphora in natural language.

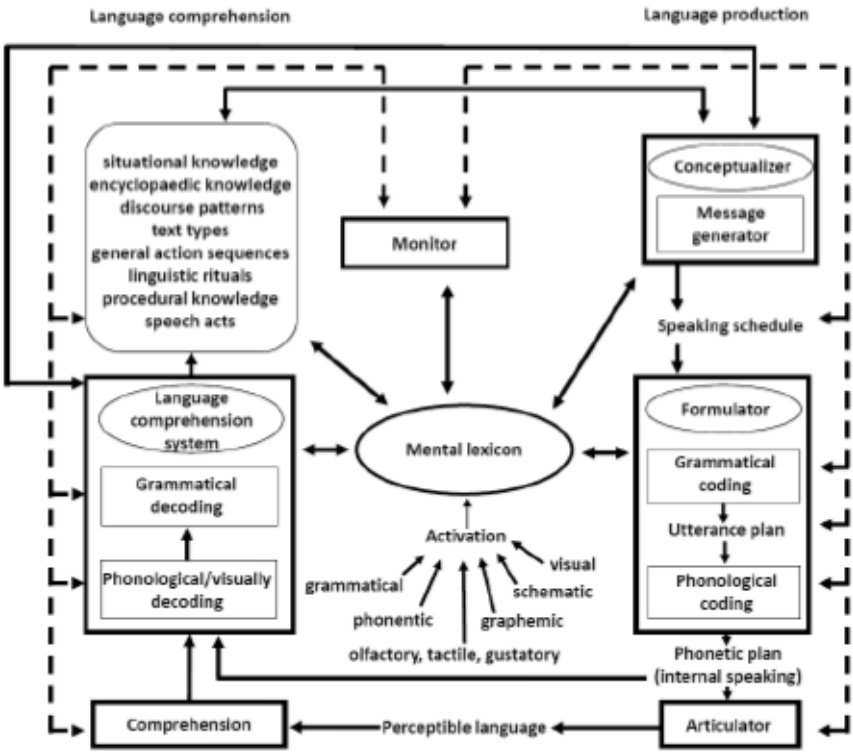


Figure 4.3: Language processing model based on Levelt (according to Roche 2013b)

Based on Levelt's model (Levelt et al. 1999), Roche (2013b) compiled all the aforementioned aspects of language processing into a single expanded model, which – in contrast to Levelt's model – satisfies culture-specific aspects of language processing. These culture-specific aspects are not only relevant for shaping multilingual situation, such as switching languages, but also relevant to psycholinguistic models, originally designed for monolingual speakers and for that reason do not sufficiently consider cultural dispositions. In summary, we can say that the mental lexicon plays a central role in language processing and functions as a link between conceptualization and formulation. In other words, even when the preverbal message is composed on the level of conceptualization, the declarative and

procedural components of lexical knowledge within the mental lexicon are still necessary (see Slobin 2003).

4.1.4 Summary

The phases of language processing:

- Conceptualization phase: a preverbal message is created and adapted to the communicative situation.
- Formulation phase: the necessary lexical knowledge is retrieved from the mental lexicon and morphologically, phonologically, and phonetically encoded.
- Articulation phase: the phonetical plan is created, containing all the information required for the articulatory realization of the message.
- The processing paths of language production and comprehension use are analogous: the parser perceives the external language and translates it into a kind of message. Its meaning is then analysed by the conceptual system.
- Parsing encompasses several processes during comprehension: word recognition via the mental lexicon, analysis of the syntactic relationships between the words, and semantic interpretation.
- The monitor supervizes all processes and can interrupt any part of the subsequent production, if necessary, to reformulate the preverbal message.
- Formulation and articulation errors have negative effects on the comprehensibility of the message and necessitate corrective procedures.

4.1.5 Review Questions

1. Which processes take place during conceptualization?
2. How and in what way do slips of the tongue state something about the process of language production? Give an example.
3. What is reconceptualization?
4. What is the cul-de-sac effect and what does it say about word recognition?
5. To what extent does formulation already begin during conceptualization?

4.2 The Organization of the Multilingual Mental Lexicon

It is commonly accepted that the complete linguistic knowledge is stored somewhere in our brains gradually expanded over time. As you have seen in the preceding chapter, all linguistic knowledge is organized and stored in different ways within the mental lexicon. This includes syntactic and pragmatic information. However, one pivotal question remains: how does the mental lexicon organize the different forms and sources of linguistic knowledge? Furthermore, in the case of multilingual speakers, how do different languages interact with each other in a multilingual lexicon? How does the multilingual lexicon develop with advancing language acquisition? To answer these questions, we need to distinguish the mental lexicon from conventional lexica. We will then present the various levels of representation within the mental lexicon using psycholinguistic experiments. The chapter concludes by showing how an increase of L2 knowledge affects the type of form-concept connections and how the resulting effects are represented in the brain.

Study Goals

By the end of this chapter, you will be able to:

- describe the structural and organizational principles of the mental lexicon
- explain the dynamic development of the multilingual mental lexicon in language acquisition
- formulate implications for the teaching of vocabulary.

4.2.1 What is the Mental Lexicon and What Does it Contain?

All of us are probably in agreement that every word we encounter during our lifetime is potentially deposited somewhere within our heads. Of course, we cannot actually retain each and every word, apart from a select few: we are not geniuses, nor are we computers. It is a fact however, that words find their way into our long-term memory in large quantities. The mental language database expands continually and is accessed when we

converse and search for words and formulations. This search can happen consciously or unconsciously. Researchers believe the **mental lexicon** stores the linguistic knowledge base crucial to language production and language comprehension (cf. Dietrich 2007). You have likely guessed that the mental lexicon is organized completely unlike common dictionaries and lexica we know from everyday life (cf. Stork 2003). In fact, a primary feature of the mental lexicon is that it is in constant flux.

First, we should ask ourselves how many words actually exist within the mental lexicon. As you can imagine, this is a question that is not easily answered. It depends on whether we choose to count either a word or an entire entry of the mental lexicon. Composites and inflectional affixes (e.g., conjugations, pluralizations, and similar phenomena) are the largest points of contention in this discussion. In the case of inflectional affixes, for instance, linguists distinguish between regular and irregular affixes: while irregularly inflected verb forms such as *went, brought,* etc., seem to have their own entries in the mental lexicon, there is no consensus on the storage of regular forms such as *helped* (cf. Penke 2006: 51). These contentious considerations aside, Aitchison (1997: 8) conjectures that the average size of a mental lexicon is about 150.000 words in a single language. Of these, 58.000 are supposedly root words and about 86.000 are derivations and composites. However, these average values can fluctuate strongly. It seems a miracle in face of the high number of entries that we are able to retrieve our desired words in about 100–200 milliseconds. Effects such as **priming**, however, may strongly influence the accessing and processing speed. Priming takes place when the presence of prior information (**prime**) or a relevant context causes shortened access or processing time spans (cf. Donough/Trofimovich 2009: 1). In experiments that specifically target priming, researchers can observe the varied influence of certain word levels (phonology, semantics, and so on) during the speaker's search for a certain target word. While naming the word *hot dog*, you could expect a faster reaction time in a speaker when providing the image of a *snack joint* as a semantic prime than if you provided them a picture of the *Royal Palace*. This is a type of context procedure that is common in psycholinguistic research of the structure and organization of the mental lexicon, such as the composition of semantic networks. You will encounter more descriptions of various priming experiments in the sections below.

4.2.2 How is the Mental Lexicon Organized?

For decades, there has been research into the organizational principles of the mental lexicon. It was the observation of frequency effects that led researchers to describe the mental lexicon as organized in the form of a word list sorted by frequency (see, for instance, Forster 1976). They imagined the language storage in our heads as a kind of huge list, headed by the most frequent words while the rarest words were in the lower regions of the list. During word activation, a language user would search through the list of his mental lexicon from top to bottom. This was supposedly why the frequent words in the top section were accessed faster than the less frequent words in the bottom section (see Spalek 2010). This idea was, however, quickly discarded, as, among other things, it was not compatible with the priming effects we mentioned earlier. If the mental lexicon was truly a mere list of words only sorted by word frequency, then the context information provided by primes would not affect the accessing speed as they do. These **context effects** show that words or rather meanings are connected with each other in one way or the other. That is why researchers nowadays assume that the mental lexicon is organized more in the form of a network with multilayered entries (also referred to as nodes). Their content changes dynamically depending on access or input. The **frequency effect** is explained through the different degrees of activation. It means that the more often a connection between two words is activated, the faster a language user can access the respective words (cf. Experiment 1 in the next chapter).

Our mental lexicon acts in about the same way when a word is activated. We can also assume that the nodes are strongly connected with non-linguistic perceptory aspects and are, therefore, also activated through our perception: tactile (touch), gustatory (taste), olfactory (smell), sensorimotor (movement), visual (sight), and auditory (hearing) (cf. **basic domains** according to Langacker 1987, also see Wildgen 2008). The word *banana* would not only invoke the visual mental image, but also activate gustatory and tactile aspects (such as the sticky feel of banana peel on the hand), because all of these conceptual levels contribute to the meaning of the word (cf. Wildgen 2008: 120). Personal experiences connected with the concrete word (such as vacationing on the Canary Islands, fruit salads in summer and similar experiences) also influence the activation of neighbouring nodes.

4.2.3 Which Linguistic Levels are Represented in the Mental Lexicon?

There are a series of phenomena which indicate the different levels of a mental lexicon. The following situation is probably familiar to you: you know exactly what you intend to say, but you cannot remember the word. It is a phenomenon known to psycholinguistics and psychology as **tip of the tongue (TOT).** Schwartz (2002: 5) defines the state of TOT as such: "A TOT is a strong feeling that a target word, although currently unrecallable, is known and will be recalled". The TOT phenomenon is relatively common: according to Schwartz (2002) an individual speaker experiences about 50–100 TOTs per year. The state of TOT is also characterized by additional aspects, according to Schwartz: language users often do not recall individual features or pieces of information regarding an entry, such as individual letters, number of syllables, or gender. The TOT state is generally accompanied by great frustration. It is especially notable that the speaker is extremely motivated to resolve the TOT state and find the word. The TOT state is interesting in the sense that it illustrates the separation of meaning and form in the mental lexicon (cf. Brown 2012). TOTs exist. Everyone agrees with that. Yet the definition of TOT states during experiments proves somewhat problematic: it relies on a completely subjective assessment of a person's own access to his or her mental lexicon. That is why the instructions issued to the participants in an assessment are crucial. In essence, there are three possibilities when reacting to a stimulus (such as a definition lacking the key word):

1. "Questioning look": the word is not known (no entry in the mental lexicon).
2. "Utterance of the word": the word is known and can be named (existing entry in the mental lexicon).
3. "Tortured, introspectively searching look": the word is known, but the word form cannot be named (tip of the tongue state, existing entry in the mental lexicon).

Experiment 1

With this little experiment, you can attempt to put your friends in a state of TOT. First, explain to your friends what a TOT state is and how they can identify it. You should also explain to them that not every stimulus can put them into such a state. It is also possible that they are not familiar with the word at all or that they are simply able to name it.

In the next step, show them the following definition and ask them which word is defined here. You are of course welcome to use a different definition.

_ _ _ _ _: behaviour that shows no interest or energy and shows that someone is unwilling to take action, especially over something important.

Correct answer: apathy

Source: https://dictionary.cambridge.org/de/worterbuch/englisch/apathy (April 2018)

An additional example of the (relative) separation of word form and meaning in the mental lexicon is the fact that **non-words** are processed effortlessly. Non-words are letter combinations that, although they are consistent with the typical grapheme-morpheme correspondences of a certain language, do not represent an existing word in the lexicon of the respective language. An example is the word *to rudge*: it sounds like a possible English word, but it has no meaning. In connection with non-words, Jescheniak & Levelt (1994) found that word frequency only influences the access to information on the word form level, not on the level of semantics (also cf. Levelt/Roelofs/Meyer 1999). Furthermore, psycholinguistic experiments involving speech disorders were able to show that the grammatical features of an entry in the lexicon are stored separately from the phonological word form. Badecker, Miozzo & Zanuttini (1995) tested an Italian subject who had difficulties finding words due to aphasia (anomy): his task was to name simple objects in pictures. The results showed that the subject was not able to name all objects (63%). Interestingly, however, he was able to correctly

name the grammatical gender of 95% of the objects shown to him. The overall pattern of the results shows, therefore, accessing the grammatical gender and accessing the word form follow different processes. Beyond that, the studies of Desrochers & Paivio (1990) and those of Bates, Dale & Thal (1995) show that the reaction time in naming the grammatical gender of nouns is reduced when the noun's final sound definitively predicts the gender (such as German word endings on *-ung* being feminine).

In light of all these findings, it seems sensible that Levelt chose to divide word entries into the two units **lemma** and **lexeme**, if only for the purpose of researching the mental lexicon. According to Levelt et al. (1999), the lemma contains the syntactic information of a word entry in the lexicon, such as a verb's prefixes and suffixes or the structure of the associated construction (nominal prefix - verb - predicate suffix). The lexeme on the other hand contains the morphological (inflection, conjugation, etc.) and phonological information (syllables, articulatory features, etc.) of the word entry. In addition to the lemma and the lexeme, there is also the level of lexical meaning, i.e., the word meaning. The word meaning is clearly distinct from the non-linguistic meaning, which is no longer limited by lexical units (words). In that way, it is possible for a non-linguistic meaning to be verbalized in the form of two or more lexical units (words). In literature, word meaning is often perceived as part of the lemma and its practical use expanded to include pragmatic, stylistic, and affective aspects (cf. Plieger 2006: 12).

Experiment 2

The best way to discover how the mental lexicon works on all these levels of the word entry is to conduct experiments. You will need at least 8 to 10 people. It is also possible to conduct this experiment with colleagues or college/university students in a discussion group.

In the following experiment, every person should write down the first word that comes to mind for the following items:

R…..

Ha….

Language ….

Summer…

For what items do the answers overlap the most? How could you explain the results in reference to the organizational principles of all word entry levels in the mental lexicon?

4.2.4 How is the Multilingual Mental Lexicon Organized?

Up to this point, we have discussed the mental lexicon from a monolingual perspective. But how do other languages factor in? Does every language a speaker masters possess its own lexicon or are they all stored together in one single lexicon? The following images (Figures 4.4a-c) depict the different possibilities for representing the bilingual lexicon based on de Bot, Lowie & Verspoor (2005). Figure 4.4a shows a separate representation of the lexica; Figure 4.4b represents a shared word network; Figure 4.4c shows a network involving activation spreading (arrows).

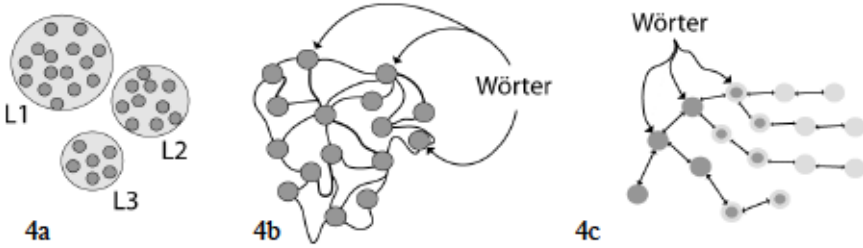


Figure 4.4a, b, and c: The bilingual lexicon (de Bot/Verspoor 2005: 43)

Several older models such as the distributed feature model by de Groot (1992) assume a separate representation of L1 and L2 word forms (as in Figure 4.4a), though they envision a shared system for lexical meanings. In contrast, the newer models assume a shared network with activation spreading (as seen in Figure 4.4c). The lexical meaning along with the word forms of all languages are jointly represented in this shared network (cf. de Bot et al. 2005). Within the network itself, the various models assume different language-specific subsets, in which certain word levels (for instance syntax or phonology) can be represented separately. We will now examine which research findings support either a shared or a separated representation of the word levels of the various languages in the lexicon.

The findings that support the (generally accepted) shared representation of lexical meaning result from cross-linguistic priming experiments. Researchers have observed that primes (preceding stimuli) in language X do indeed influence the processing of the target item in language Y (see Kroll/Sundermann 2003, Wartenburger 2010). English-speaking subjects learning German as a foreign language were able to answer the question whether the word *Schwalbe* (swallow) is an animate or inanimate object faster if the English word *dog* was supplied beforehand, rather than the word *stone*. The observed effects are similar to the effects generated by the German equivalents *Hund* (dog) and *Stein* (stone). This means that the semantic feature of being animated has a facilitating effect in the processing of the target item independent from the language.

Whether word forms are represented together or separately in the various languages is, as mentioned, contentious. However, it is not equally contended for all lexical levels: while researchers assume the phonological system is shared, research has shown no conclusive results for morphology or syntax in that regard. For instance, Costa, Kovacic, Franck & Caramazza (2003) conclude from their experiment that the gender systems of L1 and L2 must be represented separately: in their experiment, they tested the hypothesis that the coactivation of gender features increases the access speed. According to this hypothesis, the gender of the masculine L1 word *Wagen,* (der) (waggon) should be activated faster if preceded by a masculine L2 word (such as the French *le papier* (paper)). The appearance of such a coactivation effect would support the notion of a shared representation of the L1 and L2 gender systems. The results, however, showed that the hypothesis does not apply in this way. The experiment found no positive or negative influence of the provided words' gender on the L2. However, Costa et al. (2003) did find a series of reasons that spoke for a shared representation of gender:

- It is uneconomical to represent words with shared features separately.
- The grammatical gender and the semantic gender of some concepts correspond cross-linguistically (*uncle*: Germ., masc. *der Onkel*, French masc. *l'oncle*, *aunt*: Germ., fem. *die Tante*, French fem. *la tante*).

- The fact that a gender-marked L1 facilitates or complicates the acquisition of the L2 gender system also supports a shared L1 and L2 gender system (also see Jarvis/Pavlenko 2008, Prodeau 2005).

At present, the overall results indicate an additional possibility: the type of representation of the gender systems of several languages changes over the course of the L2 acquisition and should, therefore, be regarded as a dynamic system (cf. Costa et al. 2003). For more in-depth information, Jarvis & Pavlenko (2008) and Eichler (2011) provide an overview of the relevant theories and approaches in terms of the multilingual gender system.

In terms of the syntactic system, the current state of empirical research seems to support a shared representation: Hartsuiker, Pickering & Veltkamp (2004) found a priming effect for the use of passive and active voice between the languages English and Spanish. They observed that bilingual speakers (L1 Spanish, L2 English) tended to use an English passive sentence much more often when it was preceded by a Spanish passive sentence. This was not the case if an active or intransitive sentence was provided as a prime. For this to happen, the two languages must share a node for grammatical voice (active and passive) and, in consequence, the representation of L1 and L2 syntax must be shared (cf. Hartsuiker/Pickering 2008). These results however contrast with those of Loebell & Block's (2003) study, who did not find any such effects in bilingual speakers (L1 English, L2 German). Hartsuiker et al. (2004) explain the disparate results with the fact that the syntax of Spanish and English is generally the same in terms of placing the participle (English and Spanish: *The car was repaired by the mechanic, El auto fue reparado por el mecánico*), while German differs in this aspect from both English and Spanish (German: *Das Auto wurde vom Mechaniker repariert,* literally: The car was by the mechanic repaired). While the model of a shared syntax representation (see Hartsuiker/Pickering 2008) is compatible with experimental results, it ignores external influential factors such as the L2 level, contextual interference effects (disruptive effects through context), and is, therefore, not very 'ecological' (see de Bot 2010). Consequently, it is not acceptable to directly transfer the results into the context of a foreign language class.

4.2.5 How is the Semantic-Conceptual System Organized within the Multilingual Lexicon?

As mentioned earlier, researchers currently assume that the multilingual lexicon has a shared semantic-conceptual system for all languages (cf. de Bot et al. 2005; cf. Figure 4.4c). The question now is how this system is organized and how the various languages are accessed. De Groot's (1992) distribution model, for instance, explains word type effects triggered by concrete words in experiments by distinguishing between the formal and the conceptual level (see Figure 4.5 and Figure 4.6). According to de Groot (1992), every word possesses a bundle of features on the conceptual level. While in some languages concrete words share this conceptual feature bundle and are very close equivalents of each other (e.g., *casa* and *house*), the abstract words share fewer conceptual features and, therefore, are only approximate equivalents (e.g., *temor* and *fear*). For that reason, the speed of translation largely depends on the word type (abstract or concrete). De Groot (1992) assumes that **cognates** (words with identical or similar features of form and meaning in two languages) are translated the fastest due to their shared features.

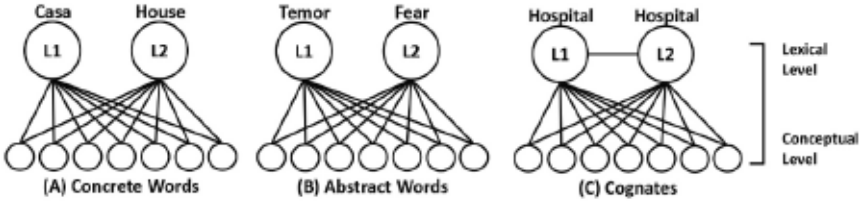


Figure 4.5: The distribution model by de Groot (1992; cf. Heredia/Brown 2006: 239)

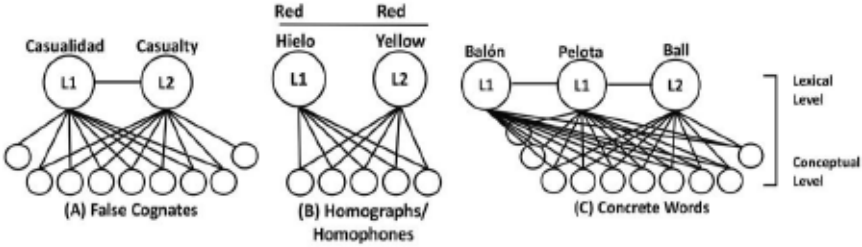


Figure 4.6: The distribution model by de Groot (1992; cf. Heredia/Brown 2006: 241)

The distribution model by de Groot (1992) may satisfy some of the observed cross-linguistic effects (e.g., word type effects), but it is not compatible with a range of other effects. Levelt et al. (1999) criticize, for instance, that feature-based models, such as de Groot's, do not resolve the "hyperonym problem": when the semantic features of a target word are indeed activated, then all of the hyperonyms should activate simultaneously, as the target word contains all features of the hyperonym (Levelt et al. 1999: 4) (e.g., *poodle: dog, animal, living being*). However, this is not the case: Levelt et al. (1999) claim that to this day, there is no proof that target words automatically activate all of their hyperonyms. An additional problem of these models, according to Levelt et al. (1999), is the fact that they cannot observe complexity effects. This means that language users access semantically basic words and semantically complex words at the same rate, independently from the number of their semantic features. Pavlenko (2009: 127) has also criticized distribution models and similar models, pointing out that the circumstances of word acquisition were ignored. He also noted how the context could cause effects to change and how the degree of activation of the involved languages was not specified. The fact that abstract words are strongly concretized via metaphorization processes should also not be forgotten (cf. Roche/Roussy-Parent 2006). In conclusion, it means that abstract words are understood as concrete words in a certain sense and may share features cross-linguistically.

4.2.6 How do Links between the Semantic-Conceptual System and Word Forms Develop?

In the previous section we learned how the links between word forms and the semantic-conceptual system actually depend on many additional factors. These links should not be viewed as categorically present, because they continue to develop over time. For that reason, we should regard links as dynamic. How can we describe the multilingual lexicon in a way that includes all of the contributing factors and, most of all, its dynamic nature?

Kroll & Stewart (1994) created the so-called revized hierarchical model (Figure 4.7). This model takes into account the effects of translation asymmetry (it is easier to translate into the L1 than into the L2, see also Kroll/Michael/Tokowicz/Dufour 2002: 139) as well as the dominant relations between L1 and L2 (the links between the words and the correspondent concepts are stronger in the L1 than in the L2).

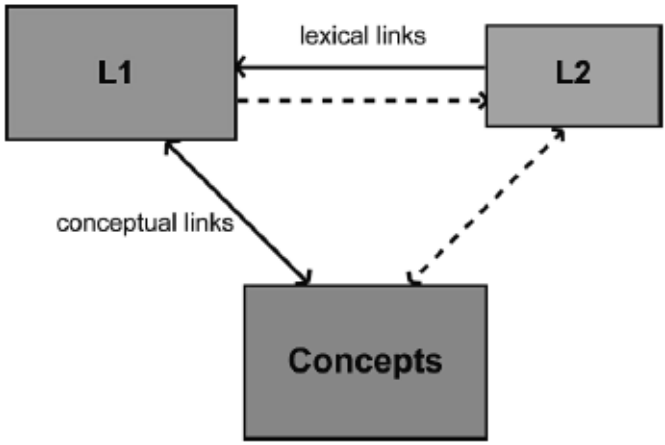


Figure 4.7: Revized hierarchical model (according to Kroll/Stewart 1994: 158)

Even though hierarchical models such as the revized hierarchical model provide explanations with respect to the difference in the access from the L1 and L2 to the concepts depending on the language level, they ignore the possible dependence of the observed effects on other influencing factors. The degree of a word's concreteness, the function of the word in language use, or the word's cognate status itself are all possible and significantly influential factors (French/Jacquet 2004). Another important point of criticism for hierarchical models is the simplification of the conceptual level. The representation of the conceptual level within a single box gives the impression that the concepts in the L1 and the L2 are identical. In that sense, the concept for *mountain* would be congruent in Dutch and in German. However, if you consider that there are actually no mountains in the Netherlands except for hills of about 300 meters, and if you compare these hills to the Alps in South Germany, whose largest mountain is roughly 3000m high, it seems only logical that different concepts of *mountain* exist in Dutch and German.

Language acquisition is more than links at a conceptual level. It is a matter of building on already existing concepts, creating new cultural-specific nuances, identifying the conceptual differences between the L1 and the L2, and using them productively.

With this in mind Pavlenko proposed the **modified hierarchical model** (MHM) (see Figure 4.8), which assumes that L1 and L2 words are represented on the conceptual level in completely shared categories, in partially shared categories or in language-specific categories. Consider the following examples: while the word *laptop* is almost completely represented within shared conceptual categories, words such as *privacy* barely share categories on a conceptual level in multiple languages due to great cultural differences. By assuming that words exist in exclusively language-specific categories, Pavlenko's (2009) model recognizes that a certain word meaning in language X cannot be simply translated, using the appropriate lexical units, into language Y. The words need to be paraphrased (cf. Grosjean 2010: 180). Partial translation equivalents represent a third scenario. These are words which only (partially) share categories. This is the case for the German word *Getränk* (beverage) and the Italian word *bibita*: whereas *Wein* (*wine*) or *Bier* (*beer*) are a *Getränk* in German, the Italian word *bibita* is limited to non-alcoholic, cold beverages (soft drinks, lemonade). In this sense, the German word *Getränk* and the Italian word *bibita* only partially share the conceptual categories. The modified hierarchical model is also able to sufficiently explain cultural-specific metaphoric extensions of concrete words and the corresponding conceptual differences between the languages (cf. Plieger 2006).

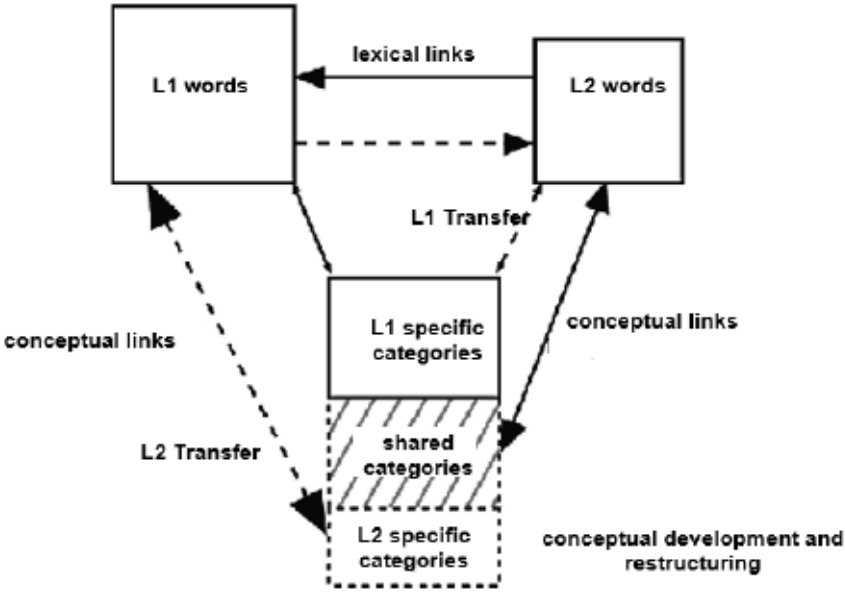


Figure 4.8: Modified hierarchical model (according to Pavlenko 2009: 147)

Another innovative aspect of Pavlenko's (2009) model is the transfer of concepts. This applies mainly to partial translation equivalents, i.e., those words which only partially share conceptual categories (such as *Getränk* and *bibita*). In such cases, it can happen that a speaker transfers the complete conceptual network of the German word *Getränk* to the Italian word *bibita*. According to Pavlenko, this can happen from L1 to L2 and vice-versa. The successful acquisition of the L2 has the consequence that such types of conceptual transfers are conceptually restructured in the L2. It means that the conceptual representation in the L2 becomes more varied by removing the conceptual elements originally transferred from the L1 and adding L2-specific conceptual elements. The foreign language learner attains conceptual competence in this way (Roche 2013b; cf. conceptual fluency, Danesi 2008).

Interacting conceptual differences and common features as well as the links between conceptual areas of languages form the basis for the pedagogical concept of transfer difference discussed at length in Chapter 8.

4.2.7 Summary

- The mental lexicon is structured like a network and organized dynamically.
- As evidenced by various language phenomena (such as TOT, speech disorders and slips), the mental lexicon contains several interconnected levels (semantics, syntax, morphology, phonology).
- Word entries are divided into two large categories: lemmas and lexemes.
- In the case of multilingualism, all of the languages are stored in the same mental lexicon and in the same semantic-conceptual system.
- The modified hierarchical model (MHM) by Pavlenko (2009) provides an explanatory approach on how word forms are linked to the conceptual level.
- The following aspects should, therefore, be taken into account: the changeability of lexical and conceptual links between the languages and the conceptual level over the course of L2 acquisition, the differences between language-specific and shared conceptual categories as well as cross-linguistic effects (such as word type effects).
- The novelty of Pavlenko's model is the varied consideration of the various possibilities for conceptual overlap between the languages: no overlap, partial overlap, complete overlap.
- This is the basis for Pavlenko's description of the processes taking place with progresses in L2 acquisition: conceptual elements are transferred from one language to the other and, through restructuring, the conceptual representations are varied and further developed.

4.2.8 Review Questions

1. What insights contradict the representation of the mental lexicon as a list of words?
2. What is the TOT state and what does it say about the mental lexicon?
3. What parts of a lexicon entry does Levelt distinguish?
4. What are the shortcomings of feature models such as de Groot's (1992) distributed feature model?
5. Which aspects of older models does Pavlenko (2009) incorporate into her model and which aspects are new?
6. What could these insights affect how you plan your language classes, especially in terms of vocabulary training

4.3 Teaching the Multilingual Lexicon

In texts and conversations, learners are often confronted with a slew of new vocabulary and are not able to retain all of the new words right away. The same is true for words that are explicitly taught and practised in class. It is sometimes frustrating for learners when they, for instance, converse with an instructor but are unable to access words they have already learned. In other cases, learners may remember exactly those words that have not come up in class or have not been explained before their use. These examples show how difficult it is to manage the learning of vocabulary. Still, empirical research provides important insights into how learners can improve the acquisition of new words through instructional measures in class and how they can learn more efficiently. Therefore, this chapter will discuss under what conditions vocabulary is acquired incidentally and to what extent an instructor can influence vocabulary acquisition through pedagogical action.

Study Goals

By the end of this chapter, you will:

- understand to what extent the teacher can influence the process of vocabulary acquisition in the L2
- become familiar with word-finding strategies as well as with the different phases of teaching these strategies
- be able to propose supportive teaching strategies for vocabulary building.

4.3.1 Incidental Vocabulary Building and Explicit Vocabulary Teaching

In the preceding units we studied several models of the bilingual lexicon and saw that less advanced L2 learners are more likely to create connections between the newly learned words and the words of the L1 via formal links (cf. Kroll/Stewart 1994, Kroll/de Groot 1997). Language learners begin forming conceptual links and the respective new conceptual catego-

ries when they advance in language acquisition in order to be able to observe the L2-specific aspects of a word's meaning. Therefore, knowledge of the L1 vocabulary is central. Despite the fact that this knowledge may support L2 vocabulary acquisition in some cases, it may hinder it in others (cf. Wolter 2009: 134; also cf. Schmitt 2008). It is worth noting that vocabulary acquisition cannot be completely planned. The teacher is only able to guide this process to a certain extent. Keeping this in mind, it appears useful to inquire what the actual role of explicit vocabulary building activities is and to what extent **incidental learning** can contribute to vocabulary acquisition.

Even though research currently considers incidental vocabulary acquisition to be important, it has also shown that explicit vocabulary building is often more efficient and more enduring (Schmitt 2008: 341, though in guided contexts). We should note, however, that the share of words learned during explicit vocabulary building in class is usually much lower than the share of words learned through incidental learning, in 'real life' or in contextual settings: in a study, Tang & Nesi (2003) found that only 2–12% of learned words were explicitly taught in the context of class activities. From a quantitative perspective, explicit vocabulary building may be viewed as less important, but it is extremely important from a qualitative perspective. Schmitt & Schmitt (2014) observed in their studies that teachers and textbooks often exclusively use high-frequency words, whereas mid-frequency and low-frequency words barely appear. However, mid-frequency words are crucial for understanding authentic texts. For that reason, Schmitt & Schmitt (2014) recommend introducing mid-frequency words after the students have acquired a certain basic vocabulary. Only then are language learners able to make qualitative progress in the acquisition of vocabulary. In order to explain the process, we should add that L2 textbooks are becoming increasingly oriented toward abstract and standardized word lists, which were developed following the establishment of the Common European Framework of Reference for Languages (CEFR). In addition, language classes tend toward simplification and generalization: the content and exercises of language classes rarely offer much to occupy a student's attention. An alternative to the above mentioned methods for the introduction of mid-frequent words could be to simply reintroduce more interesting and relevant topics and tasks for learners to tackle. It would make the question of introducing words of differing frequency less relevant.

Incidental vocabulary learning tends to take place within authentic situational contexts. In reading comprehension of the L2, therefore, it is the context of the sentence that must be viewed as an important factor (cf. Webb 2008). According to Weis (2000; also cf. Ehlers 1998),

> L2 learners are more tied to context when determining unknown words. L1 learners have independent access to some word meaning and are, therefore, capable of automatic and context-free word interpretation. (Translated from Suñer 2011: 72)

In terms of a L2 learner's orientation toward context, empirical studies have found that the informativity of the context is especially crucial to be able to learn a given word (cf. Webb 2008) and is almost completely independent from the various frequencies of word occurrences. Before these insights, varying word frequencies had been proposed to be a prerequisite for incidental, but typically highly instructive, learning (cf. Hulstijn/Hollander/Greidanus 1996, Horst/Cobb/Meara 1998, Waring/Tataki 2003, Webb 2007). According to Webb (2008), the context of some sentences encourages the analysis of new words and is considered more informative than sentence contexts that are more inhibiting and reveal less contextual information. In an experiment, Webb (2009; also cf. Webb 2007) was able to show that the repeated occurrence of the target word in informative contexts helped the learner achieve better learning results.

Having looked at how learners deduce the meaning of unknown words while reading, the following chapter will discuss how difficulties in finding words in a foreign language are resolved and how strategies to facilitate this can be taught.

4.3.2 Communication Strategies for Word-Finding Difficulties

The fact that foreign language learners experience difficulties when trying to express themselves precisely in the foreign language (especially at the lower learning level) is not surprising. For foreign language learners to overcome small lexicalization problems, they must be capable of using appropriate strategies in order to maintain conversations. The teaching of these communication strategies and their implementation in the L2-context have preoccupied researchers up to the present day (cf. Poulisse 1993,

Smith 2003, Lafford 2004, Rabab'ah/Bulut 2007). Poulisse (1993), for instance, developed a taxonomical model of **communication strategies** that has been used in numerous studies (cf. Littlemore 2003). The model is similar to Levelt's language processing model (1989; also Levelt 1999) in proposing a series of strategies which consider the distinction between the linguistic and the conceptual level. The first strategy (not often the preferable option) is ending the conversation (**strategy of message abandonment**). A second option is asking the conversation partner(s) for assistance. Poulisse (1993) also describes a series of strategies which she categorizes as compensation strategies: the **substitution strategy** refers to a word's substitution with a general term or a L1 word. During the **substitution plus strategy** the word being searched for is also replaced, but with a morphologically altered L1 word or a word creation. In the **reconceptualization strategy** the original message is reconceptualized in the conceptualizer (cf. Levelt 1989), enabling the speaker to express their message more easily in other words. Poulisse (1993) also names code-switching as a possible strategy when encountering word retrieval difficulties. Other authors such as Dörnyei (1995, 1997; also cf. Dörnyei/Scott 1995) proposed additional categories such as **stalling strategies**: in this case, the speaker attempts to bridge the lull in conversation to gain additional time for the word finding process (for instance with gap fillers such as *hm, well, maybe, I mean, uuuuh*). The use of the strategies varies strongly and depends on the learner's individual variables such as cultural background, language level, cognitive style, etc. (cf. Littlemore 2001, 2003).

In language learning outside of the classroom, the use of such strategies strongly correlates with the learner's willingness to maintain communication and is, therefore, considered to be a positive thing. Despite this, the use of strategies involving the L1 is frowned upon in some classroom situations and the L1 is actively excluded. Consequently, it should not come as a surprise that L2 learners with low learning levels find speaking difficult under these circumstances. In fact, many studies in the past have avoided the term code-switching by substituting it in alternative terms such as 'recourse to L1' (cf. Macaro 2006). Research nowadays usually views code-switching as a particularly productive strategy from a communicative perspective and, in some cases, explicitly encourages it (cf. Roche 2013b, Macaro 2006). Recent studies show that L2 learners successfully use code-switching as a strategy depending on their roles and relationships, topics, and interactions (Masna 2020). Horasan (2014) studied the use of code-

switching strategies by students and teachers and the attitude of the students toward this particular strategy. The results showed that learners used intersentential code-switching (code-switching at the sentence boundary) comparatively more frequently than intrasentential code-switching (code-switching within a sentence). The analysis of the discursive function of code-switching during classroom interactions indicated students as well as teachers most commonly switched languages during metalinguistic explanations (for instance when explaining grammar or setting tasks). The learners themselves stated that, in their opinion, the use of such a strategy had the goal of encouraging language learning at beginner's levels and to maintain the attentiveness of the students during class.

We should also not forget that the use of code-switching in authentic communication has its limits. The researcher Grosjean, for instance, assumes in his language mode model that the activation and inhibition of one or more languages constitute a continuum which oscillates between a bilingual and monolingual mode. According to Grosjean (2010: 45), the factors that influence the choice of mode are the language competence of the interaction partner, the communicative linguistic biography of the speaker, the communicative situation, the linguistic prestige, and the domain specifics.

Overall, we can conclude that the use of communication strategies is an important aid for lexicalization problems at all learning levels and depends on different factors. L1 speakers regularly utilize communication strategies of every kind, depending on which strategy is appropriate for a given situation (cf. Council of Europe 2001: 63). Bachmann's (1990) model views the successful implementation of communication strategies as an important component of pragmatic competence (knowledge of speech acts, language functions, etc.), which are an important prerequisite for the acquisition of communicative competence. Current empirical research has reliably shown that the acquisition of pragmatic competences in a foreign language is more effective with explicit rather than implicit instruction (cf. Kasper 1997, Takahashi 2010, Glaser 2013). In light of these insights, Dörnyei (1995: 80; also cf. Rodríguez/Roux 2012: 115) formulated several recommendations for teaching communication strategies, which we have summarized below:

- The training sessions should direct the learner's attention to the different strategy types as well as to their communicative potential

by discussing the possible usages of the strategies already known to the language learners.

- Teachers should generally encourage the students to be bold, take risks, and try new strategies when communicating.
- The training sessions should provide audio and video material with numerous examples of the use of communication strategies on behalf of L1 speakers or of other L2 learners. The students should be encouraged to identify, categorize, and evaluate the strategies. Recording and analysing conversations between L2 learners and L1 speakers is also recommended.
- Overall, the training sessions should help the learners achieve a certain degree of automatization in communicative situations by providing the opportunity to engage in hands-on practice.
- Certain communication strategies are regarded as transgressive or considered bad form in some cultural circles, so teachers should also discuss the intercultural dimension of communication strategies and their use.

4.3.3 Implications for Vocabulary Building in Foreign Language Classes

Taking into consideration the empirical findings we have presented here, we can make several recommendations for encouraging incidental vocabulary learning as well as explicit vocabulary building in classroom situations:

- Teachers should provide opportunities for incidental vocabulary learning and for experimenting with situations where it is necessary for learners to deducte the meaning of unknown words from context. If possible, this should go hand in hand with a discussion on metacognitive strategies (cf. Hunt/Beglar 1998).
- After ensuring that learners possess a basic vocabulary of high-frequency words, teachers should also focus on mid-frequency words (cf. Schmitt/Schmitt 2014).
- The goal of explicit vocabulary building should not primarily be the quantitative expansion of vocabulary. Explicit vocabulary building should also encourage the qualitative expansion of word

knowledge, e.g., exploring the metaphorical meaning of words (cf. de Bot, Lowie/Verspoor 2005, Hunter/Beglar 1998, Schmitt 2008).

- Teachers should convey a wide spectrum of strategies to help students deal with unknown words: for example, the use of different types of dictionaries or evasive strategies to bridge gaps in their vocabulary while they speak (cf. Hunt/Beglar 1998, Roche 2013b).
- Depending on the degree of language proficiency, different strategies of vocabulary acquisition are suitable: for instance, an increased use of the L1 to ensure that learners at a lower level make the correct connection between form and meaning (cf. Jiang 2000, 2002, Roche 2013b, Schmitt 2008).
- As far as possible, learners should create connections between related words (such as conceptual, taxonomical) to ensure that word access can take place through several channels (cf. Dixon/Thomson/Fricke 2020, Roche 2013b, de Bot et al. 2005).
- Finally, the use of words in appealing, relevant and demanding contexts (or tasks) should provide the necessary motivation and incite enough interest for sustainable learning (see Chapter 8 for task-based learning).

You might be asking yourself: how can a teacher directly implement all of these aspects in his or her teaching? First of all, we present **semantization aids** that are able to explain unknown words. Koeppel (2010) distinguishes categorically between nonverbal and verbal semantization in the L2, though semantization in the L1 is often also a solution within the context of many classroom situations. According to Koeppel (2010: 135), the category of nonverbal semantization includes strategies involving the use of objects in the classroom (such as realia/show-and-tell objects, picture cards, and visualizations) and involves representations executed via facial and gestural expressions. On the other hand, verbal semantization in the L2 is somewhat more varied and combines criteria that, to a degree, transcend semantics. Koeppel (2010: 135) names the following examples of semantization aids in the L2 (also Webb 2020):

a) Naming known words that stand in a paradigmatic and syntagmatic relationship to the target word.
   - synonym: *almost* means the same as *nearly*

- antonym: the opposite of *narrow* is *wide*
- general term: *striding* is like *walking*, but more purposefully
- hyponym (subordinate words): *season – spring, summer*

b) Definition: *A statue is a freestanding figure of a human or an animal, usually made of stone or metal.* Paraphrase: *The raven is a quite large black bird with a loud but ugly voice.*

c) Use of parallelism: *A human has nails, a cat has claws.*

d) Embedding in one or more example sentences: *Someone who works all day is tired at night, someone who is tired wants to sleep.*

e) Morphological explanation of word formation products: *Sleepwalking consists of the words sleep and walking. People who suffer from this medical disorder do simple repetitive activities, like walking, while they sleep.*

Figure 4.9: Semantization aids in the L2 translated and adopted from Koeppel (2010: 135)

In order to create connections to related words, prefabricated lexicons in the shape of dynamic **word nets** are useful aids. Word nets can serve as a tool for visualizing semantic relations, such as seen in the *VisualThesaurus* below (see Figure 4.10). Learners can click their way through the entire lexicon and explore different constellations by clicking the semantic nodes. The learner can also add another language, simulating a type of bilingual lexicon.

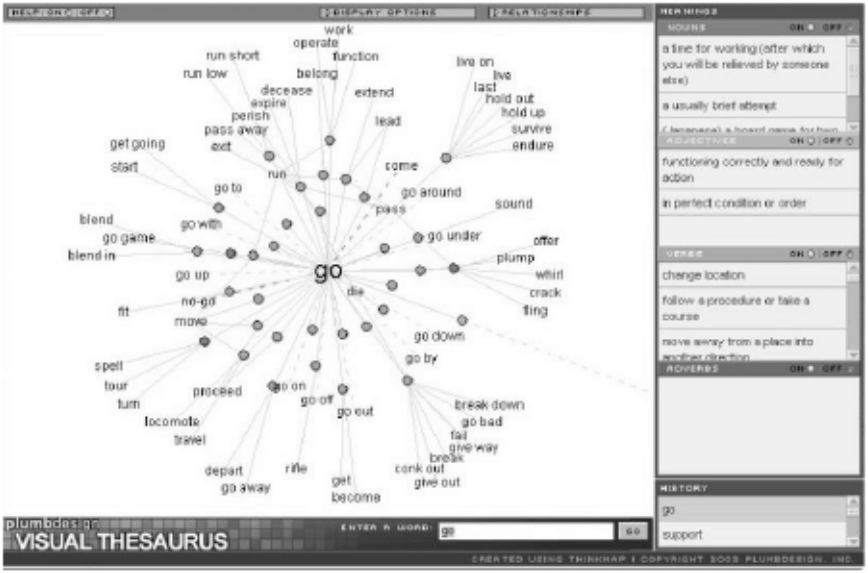


Figure 4.10: Visual Thesaurus (Visual Thesaurus 2021)

Experiment 1

Try the Visual Thesaurus for yourself. Go to http://www.visualthesaurus.com/ and enter a random word in English. In the language menu you can add additional languages to create a bilingual lexicon. You can change the languages at any time. When the free trial has expired you can start over. What do you observe in terms of correspondence between the various languages?

Word nets can also be taught to learners as a strategy: word nets can help learners represent and further develop their growing vocabulary. Learners are meant to make additions to word nets. The network-like idea of the bilingual lexicon is definitely based on the type of representation one experiences with word nets. However, according to Neveling (2004: 87), such word net strategies should only be used when the process of understanding and semantization has concluded, as he says there can be no meaning-based incorporation into the mental lexicon without a preceding mental process of creating meaning. We should also note that the word entries in the mental lexicon are not organized exclusively by semantic

criteria, but also according to syntactic, morphological, phonological, and phonetic criteria. These criteria are also crucial to the respective as well as flawless uses of a word. It seems a good idea to include additional word aspects in these word nets, perhaps when the learner has reached an advanced stage of vocabulary acquisition. Examples of such word aspects are morphologically related words, cooccurrences, homophones or similar sounding words, affective word nets, and so on, as well as the consideration of the various contexts of word use (cf. Roche 2013b, de Bot et al. 2005). According to Neveling, (2004: 88; also cf. Neveling 2005) the word-net strategy is particularly effective for several reasons: one, word nets encourage the use of verbal and image-based information (spatial representations of terms, color coding, etc.) and consequently the activation of several processing channels. These in turn provide several access points when retrieving target words. Two, in contrast to word lists, the word net strategy initiates the elaboration of word entries on several levels (lemma, lexeme, etc.). The learners are also encouraged to actively create connections. Word nets can be extended at any time and are a good depiction of the learner's advancing language acquisition, as they reflect more nuances and more depth of intralingual and interlingual links. Finally, word nets motivate learners and encourage a creative handling of language while simultaneously demanding an autonomous learning effort.

4.3.4 Summary

- Overall, it is recommended to support vocabulary acquisition through a combination of explicit instructional measures and sufficient input in the form of authentic texts.
- Successful vocabulary acquisition includes formal aspects (word form, orthography, morphology, etc.), semantic aspects (conceptual features, associations, etc.), and pragmatic aspects (grammatical functions, collocations, register, etc.).
- Even though the context of a sentence is an important factor for the incidental learning of new vocabulary, deducing word meaning from context is often unsuccessful when reading in the L2 due to inadequate language competences and a lack of semantic knowledge about the words in context.

- When a learner experiences word finding problems, the teacher should encourage them to take risks in communication and to try reconceptualization strategies or bridging gaps to solve word retrieval problems effectively while speaking. Training sessions should direct the speaker's attention to the different types of strategies as well as their potential uses in communication.
- When building their vocabulary, learners should create links to related words where possible (for instance conceptual, taxonomic) so that they can access the word through various channels.
- Embedding the words in task-based contexts which learners can experience for themselves will ensure the sustainability of the acquired vocabulary.

4.3.5 Review Questions

1. How would you explain the phases of vocabulary acquisition according to Jiang (2000)?
2. Which aspects influence incidental vocabulary learning?
3. How would you describe the advantages of communication strategies for foreign language acquisition?
4. What are the advantages of the word net strategy for vocabulary building?

5 Text and Textuality

It is not uncommon for foreign language learners to look up every unknown word in the dictionary while reading, even when the sentence's context could be easily deduced through encyclopedic knowledge. Foreign language learners are often strongly fixated on the word level, because they rarely focus on global textual coherence. They often forget that text only forms in the heads of learners, mainly by drawing on different prior knowledge inventories and less through only decoding individual words and stringing together meanings. As humans, we automatically feel the necessity to search for meaning and to create coherence with all means possible, even when the entirety of the information is not available to us. In this way, readers can, for instance, get a general picture of the contents of a whole text merely by reading titles such as *Nuts: hard outside, healthy inside*: based on our previous world knowledge, we immediately form hypotheses. Only when we read the complete text do we revize the hypotheses we previously and continuously form regarding the content of the text. While reading, the reader can consult new inventories of prior knowledge to better interpret the text. In order to make these types of interactions between reader and text possible in a classroom situation, foreign language learners should utilize their knowledge on the structure of certain text types and their typical patterns of argumentation as well as their own encyclopedic knowledge intensively. For this reason, in this chapter we will look at how reading processes take place in a foreign language and investigate the special features of texts from a contrastive perspective. In the final section of this chapter, we will discuss the added value of so-called hypertexts for teaching on the basis of empirical studies.

5.1 Text as Mental Construction

Reading does not merely consist of decoding words and contemplating how they are strung together. On the contrary: the reading process triggers a series of cognitive procedures which cause the reader to create word meanings and a coherent mental presentation of the text. The different cognitive procedures usually take place so quickly that we are hardly aware of them. Only knowing the sub-processes involved can tell us more about how reading as a specific task may be efficiently supported and optimised for foreign language learners. For this reason, the first part of this chapter revolves around the cognitive foundation of the reading process and also attempts to ascertain the initial consequences of teaching methods that encourage reading in foreign languages. We will explore additional aspects more deeply in later units of this chapter.

Study Goals

By the end of this chapter, you will be able to:

- describe concepts such as text-guided and knowledge-based reading processes and to use the resulting practical consequences (such as tasks to activate prior knowledge) in your own teaching
- explain the principles and possibilities of reading enhancement and to use them practically in the form of concrete tasks in your own teaching
- recognize the different sub-processes of reading as a descriptive instrument of reading competences in the foreign language.

5.1.1 Text-based and Knowledge-based Reading Processes

It is common for learners as well as teachers to assume that reading is a linear process of simply recognizing word meaning. For this reason, many tasks involving reading comprehension are focused on the reconstruction of the meaning of the text. Teachers often overlook that reading is a process which is used in creative and interactive ways (cf. Schnotz 2006). On the

basis of their individual preconditions (prior knowledge, strategies, interest, etc.) readers try to create **coherence** from textual meanings and to create a mental representation of the text (cf. Kintsch 1998). What exact cognitive procedures are necessary for the purpose of reading comprehension? The research on reading is in agreement that the following sub-processes actively take place during the reading process (cf. Rawson 2007: 156):

- word recognition processes
- syntactic sentence processing
- identifying the syntactic relations between the concepts among sentences
- identifying the semantic relations within and among sentences
- identifying relations that are not explicit in the text.

Especially for the first few sub-processes of reading, the reader's linguistic knowledge is of extreme importance. Word recognition, without the knowledge of the word meaning, would otherwise be impossible (cf. Schnotz 1994). Neither would it be possible to identify relations that are not explicitly named in the text without drawing on the general encyclopedic knowledge of the reader (cf. making inferences according to Rickheit/Strohner 2003). New text information, however, also determines which knowledge should be activated, or, if necessary, whether the already activated knowledge is suitable for understanding the described situation in the text. In this fashion, the hypotheses the reader has formed prior to reading a text are tested against the content of the text and modified where necessary. Even when reading only the title of a text, readers are able to form a comprehensive prediction of the content of a text. Of course, this prediction may be instantly revized in the following step when they read the first text passage (cf. Treichel 1996). The reading process, essentially, is a kind of interplay between text-based (**bottom-up**) and knowledge-based (**top-down**) processes (cf. Whitney/Budd/Bramucci/Crane 1995; also cf. Christmann/Groeben 1999, Schnotz/Bannert 2003; see Figure 5.1).

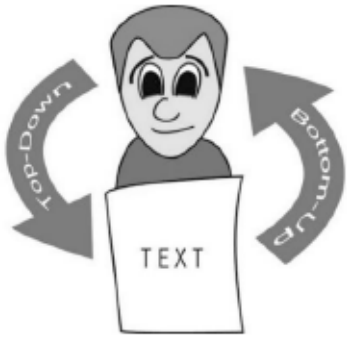


Figure 5.1: Illustration of the reading process as a combination of bottom-up and top-down processing (based on Bildungsserver Berlin-Brandenburg 2021)

Experiment 1

Let's conduct the following experiment with a text taken from a typical textbook. Imagine yourself in the position of a student. What do you know after reading the first text excerpt? What do you know after reading the second text excerpt? How does your prior knowledge change in relation to the text and what are possible consequences for teaching reading competences in class?

Text Excerpt 1

They saw it, but they couldn't or wouldn't understand. They were discontented. They shouted. They threw tomatoes.

Text Excerpt 2

They saw it, but they couldn't or wouldn't understand. They were discontented. They shouted. They threw tomatoes. In the middle of the program they left and banged the doors behind them. They could not imagine experiencing the advent of a new age. A few years later, the dancers no longer had to fear an angry audience here in the Liverpool dance theatre […].

Despite the fact that you were able to produce many hypotheses after reading the first part of the text, none of them could be really confirmed. Only

after reading the second part that placed the action in the context of a dance performance were you able to gain an accurate picture of the content of the text. We can, therefore, assume that as a reader you were already actively searching for meaning beginning with the first sentence onward and that you were also interacting with the text. The more information you processed, the more accurately you were able to revize or reassess your hypotheses. These types of interactions are the foundation for sustainably learning from texts, and that is why we will now discuss how a teacher can encourage the formation of hypotheses in a classroom setting.

5.1.2 Practical Consequences

The reason that learners put all of their energy towards laboriously decoding individual words is often due to a lack of language competences in the foreign or second language. It is also the reason learners make little use of their subject-based prior knowledge base (cf. Jenkin/Prior/Rinaldo/Wainwright-Sharp 1993, Horiba 1996, Oded/Walters 2001). It is important, therefore, to find a balance between text-based bottom-up processes and reader-centred top-down processes. This is achieved by encouraging readers to form hypotheses through set tasks that are carefully prepared for this purpose. An example of such a task is the **predictive text** (Westhoff 1997). Readers first receive individual text passages during this task and are encouraged to formulate hypotheses in terms of the text's continuation. After reading a section, the learners discuss their results in a group and then continue to read the entire text. A variation of this task is reading the first and last words of a section and to let the learner guess the content of the text passage based on the given information. Here is an example of such a task:

Text 1

There are Asian and African elephants. Asian elephants have smaller ears than African elephants and overall a smaller physique. Both species belong to the proboscidea family. Many elephants have been and still are killed in the hunt for ivory.

Keywords of a text passage can also be deleted, so that the learner has to guess the word from its context:

Text 2

There are Asian and African _____. Asian ____ have smaller ears than African _____ and overall a smaller physique. Both species belong to the proboscidea family. Many ____ have been and still are killed in the hunt for ivory.

In another variation of the task, the key word is replaced by an artificial word (see Text 3). Based on the description in the text, the learner has to guess which concept the artificial word represents. The goal of all of these tasks is a balanced reading process involving both the processing of incoming text information as well as the reader's existing prior knowledge base.

Text 3

There are Asian and African antanzukis. Asian antanzukis have smaller ears than African antanzukis and overall a smaller physique. Both species belong to the proboscidea family. Many antanzukis have been and still are killed in the hunt for ivory.

Images can also initiate the process of hypothesis formation, such as in the form of **word clouds** (see Figure 5.2). The browser-based application *Wortwolken* (www.wortwolken.com) can quickly and easily create word clouds by assembling all of the words in a collage and representing the words in different sizes depending on their frequency. Similar to the tasks we just presented above, a reader can likely guess the subject of a text or its title by looking at a word cloud created on its basis. A teacher should ensure that, if they use such images, that only thematically relevant words are depicted larger in the word cloud and make adjustments to the word cloud where necessary. This avoids, for instance, certain thematically insignificant words that usually appear frequently in texts (such as prepositions), so that they are not represented in the word cloud and cannot detract from the actual key words.

Figure 5.2: Word cloud (https://www.wortwolken.com/) based on the website of the World Health Organization (https://www.who.int/emergencies/diseases/novel-coronavirus-2019 (September 2022))

5.1.3 Mental Text Representations

Reading research currently assumes that the reader creates three different **mental text representations** while reading: the textual surface, the propositional text base, and the mental model (cf. Kintsch 1998, Schnotz 2006). The reader creates these mental representations of a text for the purpose of combining the text's various word and sentence meanings into a coherent ensemble. The different mental text representations can be created simultaneously and are arranged in a continuum which oscillates between being strongly text-bound (textual surface) and being weakly text-bound (mental model). This means that depending on the mental text representation, there is a smaller or larger distance between the content presented by the text and the mental representation of this same content. How these types of mental text representations can be characterized and how they interlock is the subject of the following sections.

5.1.4 Textual Surface

On the textual surface, processes of word recognition take place on the basis of graphemic, syntactic, and semantic word information and produce a mental text representation of the exact linguistic form of the text (cf. Schiefele 2004: 199; also cf. Grütz 2010). It means that the exact order, declination, and orthography of the words are represented on the level of textual surface. This mental text representation exists only briefly within our heads before it is overwritten or elaborated on by the next processing step, the propositional text base (cf. Suñer 2011: 27). The fact that we only retain recently processed information for a short time is obvious when we, for instance, attempt to repeat a text we have read up to that moment word by word. Under normal circumstances we would likely only be able to reproduce the last two sentences successfully. In cognitive psychology, this effect is known as the **recency effect** (cf. Hoffmann/Engelkamp 2013). Chapter 6 discusses the recency effect alongside other effects in more depth.

Over the course of the discussion on the number of items a human is capable of remembering, the psychologist George Miller (1956) proposed the number seven ± two. Later studies, however, showed that the memory span depends on individual differences (such as the ability to connect various items with each other) as well as on the text features or the individual learning tasks (cf. Taatgen/Anderson 2008). As a rule, words that are randomly strung together are less likely to be retained than words that are read in a carefully worded and meaningful sentence. You can observe this phenomenon yourself in the following experiment.

Experiment 2

We are going to conduct another experiment: how many words are you able to repeat after reading Text 1 and Text 2 respectively? How could the results of this experiment aid you when teaching reading?

Text 1

Biologists have attempted to fathom the mass mortality of bees for years. The insects are not only dying in Europe and America, more than 85 percent of the colonies in the Middle East have died as well.

Text 2

the brewing feathers found over pretty house gurgle opera communication while narrating hope proficient only the left cellphone grey the bubbling unified bed waiting sphere explicit is examine on contra trombone investigate

The main result of this experiment is that words are more easily retained when they are perceived as part of a meaningful unit. This is why it is equally as important to know the individual meaning of the words as it is to know their relation to the other words in the same context. This finding, however, contradicts the notion that a text emerges from merely stringing together individual word meanings.

5.1.4.1 Text Base

At the level of the **text base** the linguistic form is no longer relevant, the semantic content is (cf. Kintsch 1998). It means that the language user mainly retains the meaning they extract from the textual surface. As a consequence, things such as word order are no longer mentally represented. Most researchers of reading assume that text processing operates with **propositions** as elementary units of meaning on this level (cf. Kintsch 1998). Propositions consist of two components: a relation and one or more arguments, wherein the relation is usually expressed through verbs (but also adverbs or adjectives) and arguments are usually expressed by nouns (Tapiero/Kintsch 2007). Accordingly, the sentence *Eva goes to the movie theater* contains a relation (*to go*) and two arguments (*Eva* and *movie theater*). These propositions can be represented in the following form: P: GO [EVA, MOVIE THEATER].

Due to the limited processing capacity of the working memory, the reader does not retain all text propositions in the long term but summarizes and reduces them through special mechanisms (cf. van Dijk/Kintsch 1983). Based on the processing strategies described earlier, the reader forms more general and more abstract propositions, **macropropositions**. A novel, for instance, is more easily summarized by macropropositions than by individual text propositions, called micropropositions (cf. Kintsch 1998). The efficient use of these processing strategies makes tasks such as summariz-

ing, paraphrasing and problem-solving easier, as they reduce the large information volume, making it easier to handle (cf. Louwerse/Graesser 2006). The existence of these strategies for processing text information is not meant to give the impression that the reading process can be guided through controlling mechanisms or that it is linear and, therefore, predictable. Quite on the contrary, many gaps in coherence in the text base are, depending on the prior knowledge of the reader, carried through several processing cycles only to be revized, supplemented and confirmed at a later point in time (cf. Suñer 2011: 33). This means that incoming text information can affect the reinterpretation of past propositions and the activation of other bases of prior knowledge which had not been deemed necessary up to that point (cf. Linderholm/Virtue/Tzeng/van den Broek 2004). In this sense, reading can be a highly interactive, individual, and cyclical activity (cf. Kintsch 1998). In Chapter 6.2 and Chapter 6.3 you will learn in detail how to encourage these processing strategies at the text base level in terms of advanced reading processes.

5.1.4.2 The Formation of Mental Models

As a final step, readers can create a **mental model** of a text. The mental model transcends the content of the text and integrates prior knowledge bases into the reading process to a very strong degree (cf. McNamara/Kintsch 1996: 249). In contrast to the textual surface level and propositional text base level, at the level of the mental model prior knowledge serves the purpose of interpretation and augmentation of textual content, not necessarily the actual formation of coherence (Seel 2003). Hence, prior knowledge is not used to, for instance, fill a certain gap in coherence. Rather, the use of prior knowledge enables the reader to form a mental picture of how the situation depicted in the text might actually look (cf. **mögliche Welten/possible worlds** according to Seel 2003: 260). Consider the following text on a scientific topic as an example:

Tsunamis are flood waves which are usually triggered by seismic activity on the ocean floor. These marine earthquakes cause fast-moving flood waves which hit the coastlines at a high velocity and cause devastating damage there. A tsunami's force and water mass are capable of destroying entire cities and land areas.

At the text base level, the reader creates a mental representation of the issues discussed regarding tsunamis and their devasting consequences.

Based on the text content, the reader might imagine the specific consequences of tsunamis for the population of nearby villages and necessary safety precautions. Researchers call this a formation of mental models, because the reader continues to elaborate on the content of the text with their own prior knowledge and mentally simulates possible worlds (cf. Seel 2003). An analogous character is often attributed to mental models, meaning to say that they are very close to an image-based representation of contents or issues (Schnotz 2005, Dutke 1999). In the current example, we can assume that the reader imagines a concrete picture of a tsunami with the appropriate details (place of origin, velocity of the flood waves, number of houses in the nearby villages, number of people in the streets, etc.). As you see, mental models are internal and comprehensive with the depictions of the situation in the text being as realistic as possible. In contrast to the text base, the mental model's subject is often depicted incompletely. Depending on the goal, certain elements of the depicted subject or situation are emphasized while irrelevant ones are omitted (cf. Dutke 1999). Mental models conduct a type of relevance test on all of the elements and allow for a depiction of a concrete issue with varying foci. Due to their apparent incompleteness and purpose, mental models have a preliminary character allowing them to revize earlier hypotheses on the content and to simulate possible alternatives (cf. Ehlers 1998, Schnotz/Preuß 1999). Mental models are very dynamic in this way and allow a comprehensive understanding of the individual details.

5.1.5 Learning from Texts

The three possible types of mental text representations described previously are associated with the varying depths of the reading processes. While only processes of word decoding are necessary at the textual surface, the reader requires processes of coherence formation at the level of the propositional text base. These are necessary to recognize, among other things, intersentential relations within a text and to mentally represent the text meaning independently from the exact presentation form of the text (cf. Louwerse/Graesser 2006). If a reader uses their own (experience-based) knowledge during the reading process and forms a mental model of the text, then the reading performance is considered to be even more intensive (cf. Lutjeharms 2010, Schnotz 1994). In this case, researchers assume that the information extracted from the text is further processed at the

reader's own discretion or in accordance with subjectively plausible criteria and can, therefore, better connect to existing knowledge structures. This is why research considers the formation of mental models to be the most sustainable form of learning from texts. The creation of mental models is, therefore, often the goal of a more in-depth reading (cf. Schnotz 1994). Experiments have shown that the formation of mental models results in a more efficient storage and an increased retention of text content than the formation of a propositional text base. Kintsch, Schmalhofer & Zimny (1990) showed, in an older study, how the retentive effort of the respective mental text representations decreases or remains stable over time. For the purpose of their study, the authors used a text in combination with three types of tasks to target the various mental text representations after the study participants read the text. The three tasks involved the recognition of sentences with the same wording as in the text (textual surface), identification of paraphrased text passages (propositional text base), and the recognition of sentences whose correctness readers can indirectly deduce from the context of the text (mental model). The following graphic illustrates how the retentive effort of the mental model proves to be the most stable mental text representation over time. Recognition at the text surface on the other hand shows a strong decrease in retention trace strength, it drops significantly within the first 40 minutes after reading the text (cf. Figure 5.3).

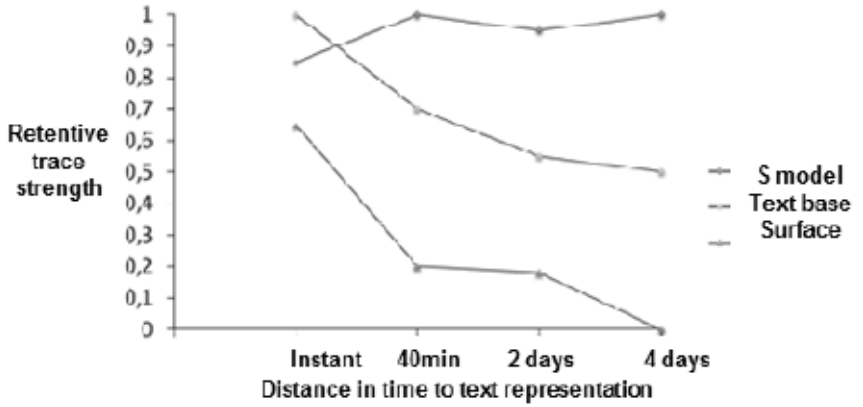


Figure 5.3: Decrease of retentive trace strength over time according to level of mental text representation (Kintsch et al. 1990: 139)

Which text representation is created always depends on the goal of reading a specific text or the specific task (cf. van den Broek/Young/Tzeng/ Linderholm 1999). If the goal of the task is to give a structured reproduction of the content of the text, for instance, then it is sufficient to form a propositional text base. However, if the reader is expected to draw conclusions from the theory presented in the text with respect to, for instance, possible application problems, then it is necessary to form a mental model. When reading or reciting a text out loud, such as for a play, it is even sufficient to merely create the textual surface without a need to trigger any greater understanding processes.

5.1.6 Summary

- The reading process interactively oscillates between bottom-up and top-down processing.
- The reader can create three different types of mental text representations while reading: textual surface, propositional text base, and the mental model.
- At the level of textual surface, aspects such as word order, declination and orthography of the text are briefly represented.
- At the level of text base, the linguistic form is less relevant. The semantic content is of significance here.
- A reader creates mental models of a text when prior knowledge bases are integrated extensively for the interpretation, assessment, and expansion of text content.
- With respect to the reading process, these three mental text representations are connected with a varying depth of comprehension. While merely processes of word decoding are necessary for textual surface, mental model formation requires executing deeper comprehensive processes.

5.1.7 Review Questions

1. How would you define the different mental text representations?
2. Why aren't all types of mental text representations created every time we read a text?

5.2 Contrastive Textology

Marianne Hepp & Marina Foschi

Contrastive textology conducts comparative analyses of languages and cultures in accordance with empirical criteria (among others, cf. Hartmann 1980/Adamzik 2001). So-called **parallel texts** reflect different cultures, by using comparative communicative frames of reference. They are texts produced in different languages, which can be seen as examples of equivalent **text types**. Contrastive textology is based on three main principles. The first two principles originate in textlinguistics, and state that:

- every text substantiates itself as a product of a certain text type (cf. Brinker 2010: 16)
- text types exhibit different cultural traits as typical communicative forms of different language communities (cf. Fix/Habscheid/Klein 2001).

The third principle states that text types are not isolated and limited to certain linguistic subject areas, but rather they are products of **text type networks** (cf. Adamzik 2001: 37). **Text type networks** arise from the interconnection of similarly structured and overall similar functions used in different text types. They are located within discourse systems which can vary depending on the linguaculture.

Study Goals

By the end of this chapter, you will:

- be familiar with, and develop concepts which promote reading comprehension, based on examples of parallel texts of different language cultures
- be familiar with, and use inferential reading strategies, which help readers to recognize linguistic devices in a foreign language text, and to comprehend them using their intuitive knowledge of text types
- recognize special features in certain text styles and their functions within parallel texts of different language cultures.

5.2.1 Text Types and Textuality

Foreign language students tend to read written texts word-by-word or sentence-by-sentence. This can lead to misinterpretations of the text and discouragement for the reader. As we explained in the introduction, **reading comprehension** is a complex cognitive process. Prior knowledge about the conventional structuring of texts, among other things, is crucial. Fortunately, **text types** are often similarly designed across languages and cultures. With this knowledge, we can collect transcultural features of text types by comparing texts of different linguacultures. These features often display transcultural traits and develop dynamically from social and linguistic interactions. There are similar conventions of text structuring across various text cultures (for more on the multifaceted term of transculturalism; cf. Roche 2013b: 254). Language pedagogy can, therefore, make use of the L1 basic knowledge on text types structure, in order to highlight what in foreign language texts appears familiar, rather than focusing on unfamiliar words and structures. An example of parallel texts are the multilingual entries in the online encyclopedia *Wikipedia*. The initial access to foreign language texts is made easier using comparisons such as those found in Wikipedia entries, as it promotes the basic activation of the **text patterns** (Heinemann/Heinemann 2002: 135) of the L1 culture. You will learn exactly how basic activation takes place in the next section.

5.2.2 Common Features of Texts in Comparison: Transcultural Features of Text Types

Have you noticed how text types are influenced transculturally? Undoubtedly, the formal and pragmatic features of different text types (communicative functions, situational circumstances, external structural features, thematic aspects, linguistic devices (Heinemann 2000: 512)) depend on historical and social circumstances, and these differ depending on the linguaculture. Since individual languages and cultures have no clear boundaries and partially overlap, interwoven constructs and text types also display transcultural features. Wikipedia articles are excellent and easily accessible examples of this phenomenon. By comparing several versions of the same entry in different languages, a specific organization of the Wikipidia text is clearly visible. The building blocks of the typical Wikipedia entry are: title, subtitle with source citation, continuous text and picture(s) with captions.

Even for beginning learners of a foreign language, the articles of the multilingual encyclopedia present a suitable exercise in reading comprehension. By comparing similarly structured texts, learners can determine at first glance which type of text they are faced with. In the case of Wikipedia, it is an encyclopedic entry, in other words, a descriptive text which has the pragmatic-communicative function of providing information on a particular subject. The **informative function** is realized through linguistic and image-based means. Regardless of their skills in (foreign) languages, readers can easily classify this type of text as a description. The quick determination of a text type relies on the readers' knowledge about the structure and function of this text type. Readers can deduce additional information due to the special interplay of their knowledge on text types, text observations, and recognition of text function. Learners can, for instance, understand the meaning of individual words by close observation of the multilingual context. Speakers of any language would thus instantly recognize which part of the Wikipedia entry is the name of the pictured object, even if the title word over the image is in another language.

Based on what we have discussed up to this point, the question is: how can text structure create an initial point of access to foreign language text comprehension? This occurs because of our experience with text types in our own linguaculture. We are able to use these experiences consciously when reading foreign language texts, because text types, as mentioned previously, are transculturally influenced. Intuitive and acquired knowledge on how various text typologies are shaped enable beginning learners to categorize texts as belonging to a certain text type. Thereby they can trigger expectations, in terms of functions and informative content, and eventually (at least partially) fulfill them.

Experiment

Try to deduce at least the basic information from the three concert posters (Figures 5.4–5.6) below. All of these posters originate in typologically different languages (German, Japanese, and Lithuanian). You will experience how, even with an unfamiliar writing system, you are able to draw information from these foreign language texts and thereby create a certain level of coherence.

Figure 5.4: Tabor choir (Taborchor 2014)

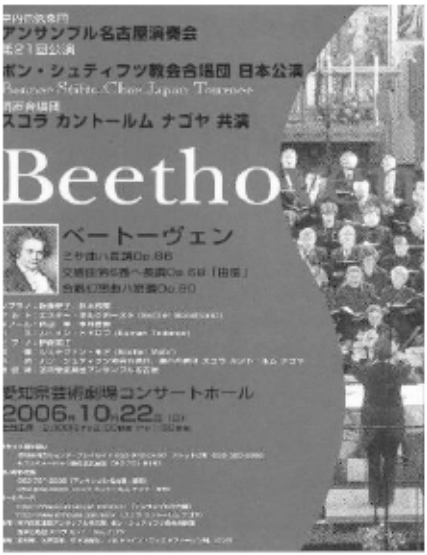


Figure 5.5: Beethoven (Erzbistum Köln 2014)

Figure 5.6: Sacra Musica (2014)

Newspaper articles are also text types which are composed similarly in many linguacultures and are, therefore, well-suited for promoting **inferential reading comprehension** in beginning lerners of a foreign language. This is especially applicable when studying foreign languages of the same language family as the L1 uses the same characters for writing. When attempting to appeal to inferential reading comprehension, learners can be asked to analyse the text for information in terms of known items (such as intemational words). Teachers can specifically instruct students to follow the prominent Anglo-Saxon model (as a text pattern) of asking interrogative questions, questions fundamental to newspaper reports. Foreign readers can deduce the information of the important aspects from the excerpt of a newspaper article below (Figure 5.7) without difficulties by asking the interrogative questions one would expect answered in a journalistic report: who? (Amy Winehouse), when? (July 23, October 2011), why? (alcohol). The reader has to infer the answer to What? (death – second examination) or fall back on prior knowledge.

Zweite Untersuchung

Alkohol-Tod von Amy Winehouse bestätigt

8. Januar 2013, 16:41 Uhr

Amy Winehouse starb an einer Alkoholvergiftung. Das ergab jetzt eine zweite gerichtliche Untersuchung in London. Der Todesfall der Sängerin ist damit abgeschlossen.

Amy Winehouse bei einem Auftritt im Jahr 2007 in Baltimore. Die Sängerin starb im Sommer 2011 in ihrer Londoner Wohnung.

Die Sängerin Amy Winehouse ist an einer Alkoholvergiftung gestorben - das hat eine zweite gerichtliche Untersuchung bestätigt. Winehouse ("Back to Black") hatte 4,16 Promille Alkohol im Blut, als sie am 23. Juli im Alter von 27 Jahren tot in ihrer Wohnung in London gefunden wurde, bekräftigte der Richter am Dienstag das Untersuchungsergebnis vom Oktober 2011. Es sei ein von Winehouse nicht beabsichtigter "Unglücksfall" gewesen.

(http://www.stern.de/lifestyle/leute/zweite-untersuchung-alkohol-tod-von-amy-winehouse-bestaetigt-1851728.html 25.10.2013)

Figure 5.7: Amy Winehouse (Stern 2016)

(Second examination
Alcohol-related Death of Amy Winehouse Confirmed
8th January 2013, 16:41
Amy Winehouse died of alcohol poisoning. This has now been determined by a second court-ordered examination in London. All speculation surrounding the death of the singer has now come to an end.

Caption: Amy Winehouse during a performance in Baltimore in 2007. The singer died in the summer of 2011 in her London apartment.

The Singer Amy Winehouse died of alcohol poisoning – this has now been confirmed by a second court-ordered examination. Winehouse ("Back to Black") had a blood alcohol content level of 0.416% when she was found dead in her London apartment on July 23, at the age of 27. The judge confirmed the findings of the examination that took place in October of 2011. It has been determined to be an "accident" which Winehouse had not intended.)

Empirically, learners will recognize instantly that this example depicts an online news article. It conveys information on the person pictured on the left side. This indicates the mental activation of the text pattern which usually takes place subconsciously. Carefully guiding the learners toward an awareness of this activation process helps them extract information from the text with more precision. Making learners conscious of the fact that the title contains the primary information or that the images in informative texts are usually not primarily decorative, but they rather contribute to the

function of the text, is just an example of how to raise awareness on text-strucuturing.

5.2.3 Textual Features in Intercultural and Intertextual Comparison

Certainly, the structure of texts does not only follow the same general conventions found in many linguacultures. On the contrary, it also exhibits many differences which depend on the culture. These cultural differences, just as the common features, have also been systematically identified and will be presented in detail. Before we take a look at these, it is important to consider how the access to texts may be complicated by certain concepts, attitudes or values, or the existence of a conceptual divergence despite a similar textual surface structure (cf. Roche 2001: 15). Making language learners aware of these divergences can help them overcome such difficulties and recognize the special expressiveness of texts showing particular unconventional structures. What is perceived as conventional or not conventional can only be truly determined by comparison. Comparing a text with the most typical example of its text type helps learners understand that all texts follow specific patterns. The following table in Figure 5.8 depicts an example of the prototypical patterns of academic texts: the three columns on the right list the designation of pre-scientific text types produced by students of German Studies in Germany, France, and Italy in similar situations and with equivalent functions. The scientific text types, which serve as models for the aforementioned text types produced by students, are to the left. The scientific text types also go by different designations in all three countries. In this case, we are using the German terms as the **lingua franca** (with English translations added in parentheses for context).

Akademische Textsorten (academic text types in German, French, Italian)			
wissenschaftliche (scientific)	vorwissenschaftliche Textsorten (pre-scientific text types)		
	deutsch (German)	französisch (French)	italienisch (Italian)
Vortrag/Rede *(lecture/speech)*	***Referat*** *(presentation)*	***Exposé***	***Relazione***
Aufsatz/Fachartikel *(paper/scientific paper)*	***Seminararbeit*** *(term paper)*	***Devoir***	***Tesina***
Traktat *(essay/short treatise)*	***Bachelorarbeit*** *(bachelor's thesis)*	***Mémoire***	***Prova finale***
Abhandlung *(major treatise)*	***Masterarbeit*** *(master's thesis)*	***Mémoire***	***Tesi magistrale***
Monographie *(scholarly book)*	***Doktorarbeit*** *(doctoral thesis)*	***Thèse de doctorat***	***Tesi di dottorato***

Figure 5.8: Academic text types (adapted from Foschi 2009: 121)

On a structural level, all of these text types follow the textual pattern of argumentative speech which is typical in the Western culture. Part of the prototypical pattern of argumentative speech is the thematic structure, which comprehends several parts: introduction (**exordium**), narration (**narratio**), evidence (**argumentatio**), refutation (**refutatio**), and conclusion (**conclusio**). We can, therefore, assume that all the text types listed in the table above follow this basic structure, especially because the international scientific community, for the most part, attempts to operate in accordance with universally accepted conventions.

However, we can also perceive major differences in the conventions of argumentative text in the 'real' text world. Just like any other text type, even the structure of written texts of the academic "network" (to continue using the same example) is partly due to different cultural traditions. According to Sa'adeddin (1989: 48), Arabic scientists tend towards using a different argumentative structure than the traditional Western one when composing English texts. These texts often exhibit a more frequent use of implicit facts, abstract generalizations and a higher frequency of repetition and paraphrasing. While solid expectations can be helpful in traditional text patterns to understand a foreign language text, they can also incite a certain insecurity in understanding foreign cultural features. Overall, language learners are challenged by what has been called transfer differences. In the context of comparative text analyses (reading a foreign text) the task requires comparisons between the readers' existing linguacultural knowledge and the target language in order to construct meaning. It is important to make foreign language learners aware that texts can only be understood in detail during the act of reading if the social and time-contingent conventional features of its origin are known.

This phenomenon of parallelism in texts exists beyond the intercultural aspect. The text type networks also include a diverse range of similar and mixed text types within a single linguaculture. Text specimens always exhibit text type specific features and thereby reveal their affiliation to a certain text type, but other texts might diverge from the prototypical pattern. When the structure of a text type is not institutionally regulated, texts can exhibit a very low degree of standardization and show a great variability in form, such as in the case of diaries.

In fact, the text type 'diary' is only marked by the following features (in German; cf. Fandrych/Thurmair 2011: 264):

- A diary consists of chronologically progressing entries by one and the same person.
- The chronology determines the external textual structure.
- A large number of experiences and thought processes form the subject.
- The main function is the documentation of and reflection on what has been experienced.

- Introspection is the traditional communicative situation, which leads to great freedom in the choice of subject and spontaneity in expression (a characteristic nowadays rarely found in public online diaries or blogs).
- Typical linguistic devices include a change of tenses between past and present with respect to different time periods and a high frequency of temporal expressions and verbs which express feelings and judgement. A common stylistic phenomenon in diaries is syntactic ellipsis.

We will now study various examples of personal diary entries: the first example (Text 1) is taken from the diary of Franz Kafka. The second example (Text 2) shows the diary entry of a thirteen-year-old girl from an upper-middle-class family during the same time period. Sigmund Freud recommended the publication of her records through a psychoanalytical publishing house for scientific purposes. He regarded it as an authentic documentation of the *Seelenregungen* (emotional reactions) of *die Entwicklung des Mädchens unserer Gesellschafts- and Kulturstufe in den Jahren der Vorpubertät* (the development of a girl in our society and culture level in her prepubescent years). All this is noted in the foreword of the edition, while also emphasizing that *kleine Unebenheiten des Stils und Verstöße gegen die Rechtschreibung* (small deviations of style and orthography) were maintained as they were *Äußerungen affektuöser Strömungen, als echte Fehlleistung aus dem Wirken des Unbewußten* (expressions of affective tendencies, as authentic errors originating in the machinations of the unconsciousness). The third and most current example (Text 3) was published by a female student in a blog. All three texts belong to the same text type. Text 1 and Text 2 are also parallel texts in terms of their chronological order, as they are from the same period. Text 3 was composed roughly a hundred years later, but can be considered a parallel text to Text 2, due to the age and gender of the authors.

Text 1:

19. Dezember [1910]. Im Bureau zu arbeiten angefangen. Nachmittag bei Max.

Ein wenig Goethes Tagebücher gelesen. Die Ferne hält dieses Leben schon beruhigt fest, diese Tagebücher legen Feuer dran. Die Klarheit aller Vorgänge macht sie geheimnisvoll, so wie ein Parkgitter dem Auge Ruhe gibt,

bei Betrachtung weiter Rasenflächen, und uns doch in unebenbürtigen Respekt setzt.

Gerade kommt meine verheiratete Schwester zum erstenmal zu uns zu Besuch.

(Franz Kafka, *Tagebücher* 1910-1923. Quelle: Projekt Gutenberg, https://www.projekt-gutenberg.org/kafka/tagebuch/tagebuch.html, Stand Mai 2022)

(Started working at the bureau. Afternoon at Max's.

Read a little of Goethe's diaries. The distance has a calming hold on life, and these diaries fire it up. The clarity of all these procedures makes them mysterious, as the park fence gives the eye tranquility when regarding lawn areas and yet still infuses us with unparalleled respect.

My married sister is now coming to visit for the first time.)

Text 2:

20. September: Nur ein paar Worte. Heute hat die Schule wieder angefangen. Gott sei Dank, als Klassenvorstand haben wir wieder die Frau Dr. M. Das Frl. Steiner ist jetzt auch Doktorin, am Ende des Schuljahres hat sie das Doktorat gemacht. Dann haben wir eine neue Frau Dr. In Geschichte, wir wissen aber nicht, wie sie heißt. Die Vischer hat nämlich in den Ferien geheiratet!!! Das ist zum Kugeln, die!!! Die Dora sagt, der ihr Mann möchte sie nicht sein; wahrscheinlich läßt er sich bald wieder scheiden von ihr. Überhaupt Augengläser bei einer Frau. Einen Zwicker lasse ich mir gefallen, den kann man wenigstens weggeben. Aber Augengläser! Die Dora kann auch nicht begreifen, wie ein Mann eine mit Augengläsern heiraten kann. Und die Hella sagte oft, ihr wird zum Brechen, wenn die Vischer so mit ihren Augengläsern funkelt. In Naturgeschichte haben wir einen neuen Professor. Ich bin riesig froh, daß wir drei Doktorinnen und einen, eigentl. zwei Professoren, nämlich doch auch in Religion haben. In der III. haben sie bloß 1 Doktorin, das ärgert sie sehr, die Dora hat 2 Doktorinnen und 3 Professoren.

(Unknown author, diary of a teenage girl (from 11 to 14 1/2 years old), *Tagebuch eines halbwüchsigen Mädchens*, Leipzig/Wien/ Zürich, Internationaler Psychoanalytischer Verlag, 1921 (1919). (Source: Projekt Gutenberg, http://gutenberg.spiegel.de/buch/-7110/1, Dezember 2016))

(September 20th: Only a word or two. School began again today. Thank goodness Frau Doktor M. still takes our class. Frl. Steiner took her doctor's degree at the end of the school year. In history we have a new Frau Doktor, but we don't know her name yet. The Vischer woman has been *married* in the holidays!!! It's enough to make one split with laughing that anyone should marry her!!! Dora says she wouldn't like to be her husband; but most likely he will soon get a divorce. Besides, spectacles in a woman are awful. I can put up with a pince-nez for one does not wear them all the time. But spectacles! Dora says too that she can't understand how a man can marry a woman with spectacles. Hella often says it makes her feel quite sick when Vischer glares at her through her spectacles. We have a new natural history professor. I'm awfully glad that three of our mistresses have doctor degrees and that we have one or really 2 professors, for we have the Religion professor, too. In the Third they are frightfully annoyed because only one of their mistresses has a doctor's degree. Dora has 2 doctors and three professors. (Source of Translation: *A Young Girl's Diary* https://www.gutenberg.org/files/752/752-h/752-h.htm, September 2022))

Text 3:

Samstag Einweihungsparteeeey!!!

25. Februar

WIR haben es ENDLICH ENDLICH geschafft. Keiner hat es für möglich gehalten: ABER!!!! WIR HABEN UNSERE ERSTE UND SUPERHÜBSCHE WG gefunden :D. Daher laden wir für Fr. Ab 20 h ein und feiern den abgewandten Untergang. Für G/E ist gesorgt. Es dürfen aber natürlich trotzdem alle etwas mitbringen ☺.

(Saturday house warming parteeeey!!!

February 25th

WE have FINALLY FINALLY done it. Nobody thought it was possible: BUT!!!! WE FOUND OUR FIRST SUPERCUTE APARTMENT :D. We invite you to join us on Fr. Starting 8 o'clock to celebrate the lucky escape. We are providing D&F. You may still all bring something yourselves ☺.)

We can observe features specific to the text type in each of these very different texts. Among these features are the date as a sign of the chronological arrangement of the text, the unreflected 'spontaneous' text structure, and the choice of topics in relation to personal experiences. On the linguistic level, we see an alternating use of past and present tense forms and various expressions of time. Implicit utterances appear much more frequently than elliptical constructions, even though we encounter them in all three example texts.

The most conspicuous differences of the example texts are found mainly in the area of the situational frame. The first two texts (with a similar background in terms of era and society) were originally created for introspection, the third one was created for a publicly accessible blog from the beginning. Still, this last fact does not change anything about the aforementioned features relating to the freedom and spontaneity of expression. Of course, the universal relevance of the subjects of a Kafka text cannot be compared with those of the two following authors. We also see situation-dependent differences, though mainly on a graphic level: Text 1 and Text 2 were realized as blocks of text while Text 3 consists of individual building blocks which are separated by prominent punctuation marks or unusual capitalization or even emoticons. Incidentally, these final characteristics are also viewed as features of the texts of new media. In this regard, it is interesting to observe that Text 2, produced by an apparently well-educated student one hundred years ago, exhibits similar markers of youth language as Text 3. Both tend toward emphasis and expressiveness like other everyday languages. The cursive emphasis of the word *geheiratet* (married), the two incidents of triple explanation marks and the colloquial expressions *zum Kugeln* (split with laughing) und *zum Brechen* (feel quite sick) can also be counted among such features.

5.2.4 Summary

- Contrastive textology performs comparative language and culture analyses in accordance with empirical criteria.
- The objects of these analyses are parallel texts produced in different language contexts. These texts are examples of equivalent text types.
- Parallel texts mirror different cultures in comparable communicative circumstances.
- The intercultural and intertextual comparison of parallel texts builds and strengthens an awareness of how texts are constituted as realizations of text types and products of text type networks.
- Promoting reading can be based on:
    - concepts which increase competence in finding known items in foreign language texts (i.e., create islands of comprehension)
    - concepts which help recognize unconventional elements in texts as particularly expressive devices.
- Contrastive textology also introduces strategies for inferential reading or strengthens these strategies through textual comparisons.
- With the aid of the knowledge about the text type of the L1 language, unusual features of style in foreign language texts can be recognized alongside text function(s) and linguistic devices, and, therefore, can be attributed to meaning.
- The results should be implemented in your own foreign language classes and tailored to the profiles and needs of your learners.

5.2.5 Review Questions

1. How does contrastive textology operate and what is the object of comparative analyses?
2. What type of awareness does the intercultural and intertextual comparison of parallel texts inspire?
3. What is the role of L1 text type knowledge for reading comprehension in a foreign language?
4. How do beginning learners of a foreign language build 'islands of comprehension' when accessing a written text?
5. What is inferential reading comprehension?

5.3 Hypertext

In the preceding chapters, we have seen how textuality is mentally constructed and we have become familiar with the relevant contrastive aspects of texts. The following chapter is dedicated to **hypertext.** Hypertext as a form of text which can illustrate the constructional character of a text. For this reason, it is particularly well suited to language teaching. In this chapter, we ask questions such as 'What exactly is a hypertext, and how can we distinguish it from conventional texts?', 'What is so special about coherence formation when reading hypertexts?', and 'What are the advantages and disadvantages of hypertexts in language teaching?'. In order to answer these questions, we will first discuss the distinctive features of hypertexts followed by a discussion of the potentials and disadvantages of a hypertextual learning environment. Finally, we present practical examples intended to illustrate the added value of using hypertexts in language teaching.

Study Goals

By the end of this chapter, you will be able to:

- identify hypertexts among other text forms
- describe the potentials and disadvantages of hypertexts for teaching language and culture
- conceptualize hypertexts for your own teaching.

5.3.1 The Basics of Hypertexts

In his essay *As we may think* Vannevar Bush (1945) describes the fragmentation of a stock of textual and image-based information as well as the flexible interlinkage within them as the most important features of a type of text we nowadays refer to as hypertext (although Bush never explicitly uses the modern term). After revisiting these two features years later, Nelson (cf. Wedeles 1965) described hypertext as a *non-sequential* text form. He was referring to the possibility of a multi-linearization of text and picture stocks as well as their flexible interlinkage. Following Nelson's descriptions, hypertext was regarded as a text form that allowed readers to

choose the order in which they processed text units. DeStefano & LeFevre (2007: 616) offer a more up-to-date definition of hypertext: "Hypertext can be defined broadly as a collection of documents containing links that allow readers to move from one chunk of text to another". Hypertexts are fundamentally comprised of nodes and references. The nodes contain content we generally refer to as texts. Basic, nuclear and self-contained information units are deposited within the nodes in varying amounts (cf. Unz 2000: 19). The references, also known as links, connect the nodes through different content criteria (cf. Plötzner/Härder 2001). According to Kuhlen (1991), hypertexts use referential (or associative) and organizational references.

Organizational references are motivated semantically (for instance *in contrast to*) or pragmatically (for instance *in the next section, finally*) and mainly fulfil a hierarchical and structured function of hypertext organization, despite it being associative references which make the conceptual relations between nodes explicit (Kuhlen 1991: 104, Lackerbauer 2003: 48). Associative or referential links cannot be justified semantically or pragmatically, and for this reason are also referred to as unlabelled references (Kuhlen 1991: 1104; also cf. Unz 2000: 20). The Wikipedia entry *University of Munich* contains a myriad of **referential links**: a large number of words (for instance *university, Duke Ludwig IX)* in the text body are linked to the respective Wikipedia entries (**nodes**). Not only is the Wikipedia text a hypertext, but so is the online encyclopedia Wikipedia itself. The referential links form a kind of associative, non-hierarchical, and in parts chaotic structure that is characteristic of many hypertexts (cf. Huber 2002).

The structure of hypertexts strongly depends on the types of links the nodes connect and are decisive for how much freedom the reader has to choose the order of the nodes (cf. Suñer 2011: 126). When a hypertext contains referential links, then it exhibits a predominantly network-like structure (see Figure 5.9d). This type of structure mirrors the diversity of conceptual relations and allows the reader tremendous freedom in choosing their reading paths (Tergan 2002: 102, Gerdes 2000: 203). However, the reader must also possess a high degree of prior knowledge on the topic in order to be able to find their bearings within this kind of open structure. For this reason, introductory works on certain subjects often prefer linear hypertext structures with predominantly organizational references (such as in guided tours or instructions). In linear hypertext structures, the reader's freedom of choice is strongly limited by the predetermined path (cf. Tergan

2002: 102, Gerdes 2000: 203). Despite this, the linear nature of these hypertexts should not be confused with the linear nature of normal texts. Linear hypertexts are still divided into nodes and offer the reader the possibility of jumping forwards and backwards linearly on these nodes, or even skip one. Finally, hierarchical hypertexts present a middle ground between network-like and linear text structures. They illustrate different levels of abstraction and meaning, as well as contextual coherencies (Tergan 2002, Gerdes 2000). We can, therefore, say that while hierarchical hypertexts provide pre-structured reading paths, they do not offer a linearization of the content. The following figures illustrate four possible types of hypertextual structures:

Figure 5.9a: Linear hypertext structure (based on Lackerbauer 2003)

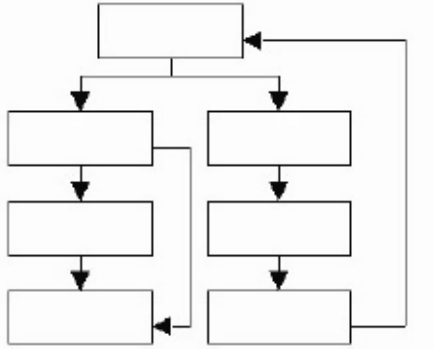


Figure 5.9b: Hierarchical hypertext structure (based on Lackerbauer 2003)

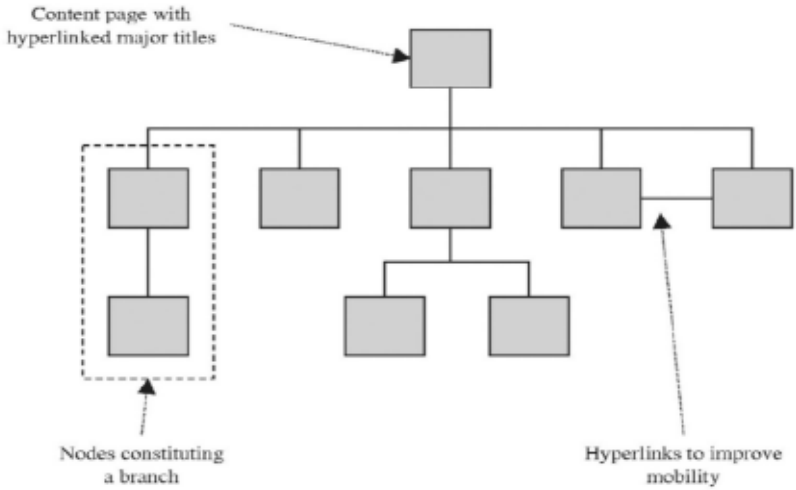


Figure 5.9c: Hypertext with flat hierarchy (Tung et al. 2003: 70)

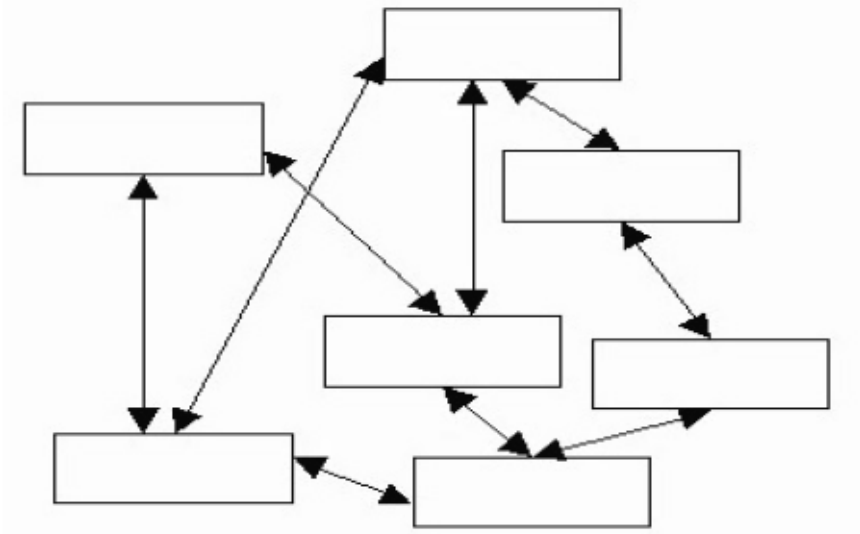


Figure 5.9d: Network-like hypertext structure (based on Lackerbauer 2013)

5.3.1.1 How are Hypertexts characterized?

The definition of hypertext often identifies other aspects alongside non-linearity, such as their electronic realization or multimediality. Storrer (2008), for instance, defined hypertext in reference to an expert survey by Flender & Christmann (2000), writing that: "hypertexts are non-linearly organized texts which are managed via computer technology" (translated from Storrer 2008: 318). While these criteria have also been attributed to the precursors of hypertext, they do not present actual factors that differentiate them from conventional texts, except for perhaps the reference to digital technologies. Positions such as this have led to a kind of media craze in the language classroom. For this reason, the next section will discuss problematic aspects of focusing only on the media aspect.

5.3.1.2 Is Every Electronic Text a Hypertext?

A purely electronic form of realization is often falsely cited as the distinctive feature of hypertext. E-books or electronic magazines are not structured in a significantly different manner compared to conventional texts. They could basically be printed as well. These are merely cases of linear texts which have been realized electronically. The resulting difference in the reading experience is in no way qualitatively different. Of course, readers can also simply skip lines or individual sections just as in a hypertext and thereby, in a certain way, control the sequence or amount of information themselves. However, the authors of linear texts do not expect such pro-active behavior on behalf of the reader, and so skipping lines and sections of a linear text often happens at the expense of textual coherence.

When the situation is reversed, we find that not every printed text is actually a linear text. Text types such as encyclopedias, cookbooks, holy scriptures such as the Bible or the Talmud or even city maps or rapid transit maps expect the reader to process the content in a non-linear fashion. For this reason these text types are regarded, from a semiotic perspective, as hypertext-similar text specimens (cf. Scholz/Eisenlauer 2008, Roche 2006, 2007, 2008). In fact, Conklin (1987) speaks of manual hypertexts in this context. Even though manual hypertexts possess a strongly interlinked structure and modularity, they are not digitalized, and their references are somewhat more tedious to access. In other words, the reader has to flip through the pages of a book or article to locate a particular reference. It is simple to realize manual hypertexts in electronic form.

5.3.1.3 Is Every Multimedia Collection of Material a Hypertext?

The use of differently coded materials (cf. Chapter 7) is often cited as a distinguishing factor when comparing hypertexts to conventional texts (cf. Berk/Devlin 1991, Hallet 2008). The composition of multimedia content within an organized network is easily and primarily achieved electronically: the simultaneous depiction of different content, jumping to and between various media (videos, text, audio etc), the rapid sorting or search for great amounts of information using keywords and criteria, and so on (cf. Hendrich 2003) are all possible through computers. Still, hypertexts cannot be distinguished from conventional texts only based on the criterion of multimediality (combining images and text). Multimedia content such as picture stories or movies are generally conceptualized in a certain way that causes recipients to process the information linearly without any alternatives, for instance. This type of feature corresponds more with conventional texts than hypertexts. The criterion of multimediality alone does not make a hypertext. Instead, hypertexts are located within a possible descriptive dimension (cf. Storrer 2008). In that sense, narrations of picture books aimed at children and based on text fragments, images, representations of gestures and facial expressions, different forms of articulation, as well as references to the worldly experience of the listeners, would count as typical hypertexts.

5.3.1.4 Is the Whole World a Hypertext Consisting of a Single Node?

When we compare an online course by the platform *Babbel* with the website of the garden association *Kleingartenverband München e.V*, we instantly see that the nodes contained in these websites are on completely different scales, despite the hypertextual character of both internet pages. It makes one wonder how large a single hypertext node is allowed to be to still count as only one and not as an independent linear e-document (cf. Storrer 2002). Schulmeister (2007) discusses the problem of too large or too small hypertext nodes in terms of text processing as follows:

> An excessively large segmentation of the text units may counteract the hypertext principle, meaning to say that the user is no longer aware that they are encountering a hypertext. […] splitting the information into information units that are too small may lead

> to an atomization of the information. This could affect the text user's cognitive reception: they can no longer determine any coherent connections and cannot comprehend. (Translated from Schulmeister 2007: 245)

Even though an ideal scale of hypertext nodes cannot be determined, Horn (1997) revisited several cognitive psychological findings (cf. Miller 1956) in an attempt to quantify the text amount of the chunks in the form of information units. According to Horn, hypertext nodes are ideally processed at a size of seven plus/minus two sentences (chunks) (cf. chunking principle, Horn 1997; cf. Chapter 6). Horn formulates additional principles based on this formula, such as the labeling principle or the relevance principle. The use of these principles is meant to ensure optimal information processing (such as emphasizing relevant aspects, attributing types to links, etc.). The granularity of the nodes, in the sense of how strongly they are differentiated and if the principles are applied, strongly depend on type, purpose and total extent of the information meant to be conveyed. According to Lackerbauer (2003):

> Smaller information units are formed for lexicons and other references, in which the individual entries are clearly deliminated and rarely read in a general context. When certain argumentational structures are meant to be preserved, larger information nodes are created. We cannot however apply overall rules to determining the granularity of these chunks. (Translated from Lackerbauer 2003: 32)

Beyond these findings, empirical research of hypertext comprehension has shown that apart from the granularity, factors such as the presentation (verbal versus pictorial), the prior knowledge of readers, the tasks, etc., play decisive roles (cf. Suñer 2011, Amadieu/Tricot/Mariné 2009, Cangoz/Altun 2012, DeStefano/Lefevre 2007). Section 5.3.3 (Learning with Hypertexts) discusses to what extent hypertext comprehension can be successfully promoted through instructional design measures in terms of all of these factors. However, first we will determine what the distinctive features of hypertexts actually are.

5.3.2 What is Actually New About Hypertexts?

After we have attempted to ascertain the characteristics of hypertexts in comparison to traditionally composed texts, we must now ask what *exactly* is new about hypertexts, and to what extent the circulating definitions of hypertext name any unique features. According to Hendrich (2003: 54) the following three aspects are what is really new about hypertexts:

- manifestation of textual links
- a new form of connecting texts with each other
- their operationalization and the resulting interactivity.

The manifestation of textual links refers to the visibility of the interlinkage of the individual text or partial text nodes, as well as the references to other texts (intertextuality). Hyperlinks make apparently hidden text links visible on a macrostructural level and are usually implicit or incidentally recognized when reading conventional texts. As mentioned earlier, hypertexts contain comparatively more associative references than conventional texts. Associative references ensure a horizontal assembly of information, while hierarchical references make a vertical assembly of information possible (Hendrich 2003: 46). (Discursive) deictic expressions such as *in the next section*, *at a later point*, *in the following* are rarely found in hypertexts. Due to the atomization of a text through hypertext nodes and the many information sequencing options deictic expressions can only represent the information structure to a certain extent (Huber 2002: 29).

This new form of connecting texts with each other is, according to Hendrich (2003) based on the fact that information in hypertexts does not follow a specific order due to its characteristic network of nodes and links, at least not physically. This fact leads to the third and most important characteristic of hypertexts: namely, their operationalization and the resulting interactivity (Hendrich 2003). As hypertexts do not predetermine a certain reading sequence due to a lack of physical bonding within the text, readers must create their own sequence by making navigational decisions at the macrostructure level. This means in consequence that the actual text is only created when the reader composes the hypertext nodes in a fashion coherent to them. In other words, the comprehension process is markedly more active and more dynamic than in conventional texts (Hendrich 2003: 42). The multiple sequencing and the resulting predominant incompletion (the reader must compose the content) are considered an advantage, especially

in foreign language teaching (cf. Roche 2007). Hypertexts are able to depict the mental and interactive character of mental text constructions, but such high demands may overwhelm the reader and lead to a cognitive overload, as the readers are forced to make navigational decisions alongside their typical tasks. Working with L2 hypertexts in foreign language classes has cognitive consequences, and these will be discussed in the next two sections.

5.3.3 Learning with Hypertexts

The new medium offers a new method of processing information, which differs from print media in several ways. In order to assess whether hypertexts are more effective for learning than conventional texts, we will look at cognitive-psychological aspects of text comprehension and at learning processes involving hypertexts in the context of L2 acquisition.

5.3.4 The Potentials of Hypertexts

As mentioned in Chapter 5.1, text comprehension is an interactive and constructive process (Schnotz 2006). It represents the initial interaction between text knowledge and the readers' knowledge leading to the construction of a mental text representation of varying depth. Constructing a mental text representation involves decoding processes of text information (bottom-up) as well as making inferences based on prior knowledge (top-down) (cf. Louwerse/Graesser 2006). Hypertexts make the constructional and interactional character of text comprehension more transparent, as the readers make navigational decisions on how various pieces of information are composed, effecting a step-by-step construction of a mental text representation. In this overall process, readers have to carefully consider which piece of information they attach next in order to form a coherent text presentation together with the text information processed up to that point. However, these decisions often prove to be unsuccessful at a later point and must be revized. Only when the readers take charge of their own reading or learning processes, can coherence be created (Roche 2007: 172). The following diagram by DeStefano & Lefevre (2007) shows how complex the process of coherence formation through navigational decisions is from a cognitive perspective:

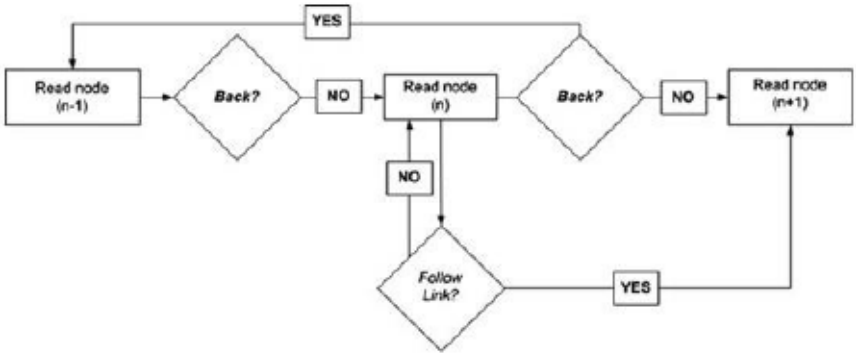


Figure 5.10: Process model of the reading of hypertexts (DeStefano/LeFevre 2007: 1619)

As hypertexts generally allow the reader to perform multiple information sequencing, the different preconditions (prior knowledge, interests, learning types) are taken into consideration more than in linear texts, as the latter provide only a pre-structured path towards information (cf. Roche 2007, Schmidt 2006). The freedom to make individual decisions in terms of selection, organization, and integration of information is evident in hypertexts, for instance in the great variety of the visited websites with respect to navigational paths (cf. Britt/Rouet/Perfetti 1996). Some approaches (cf. cognitive flexibility theory, Spiro/Coulson/Feltovich/Anderson 1988; connectionist approaches see Koch 1992) assume an equivalency between the type of knowledge representation in hypertexts and the mental knowledge structures in the human brain and, for this reason, hypertexts are alleged to facilitate knowledge transfer. According to the cognitive flexibility theory (CFT), hypertexts promote multiperspectivity as well as an appropriate representation of complexity in terms of solving problems in non-transparent subject areas. According to these theories, hypertextual learning environments offer different ways of accessing the learning materials and support multiple solution paths. Compared to linear texts, the use of hypertexts leads to a more flexible application of new knowledge. Current hypertext research heavily criticizes the central assumption of cognitive flexibility theory (CFT) in regards to the supposed similarity between knowledge presentations in hypertexts and mental knowledge structures (cf. Unz 2000, Bannert 2007, Zumbach/Rapp 2001). The point of criticism is that the information within the hypertext node is arranged sequentially, just as

with conventional texts, and considers certain syntactic regularities (mainly word order, punctuation, etc.) at the level of the textual surface. In other words, before the reader integrates the various hypertext nodes in a network-like fashion into the mental knowledge structures, they must process the information on the textual surface serially (cf. Bannert 2007). According to Rumelhart, Smolensky, McClelland & Hinton (1986) schemas are not necessarily organized in a networked form but rather in a hierarchical form, a form which produces additional sub-schemas. In this particular way, mental text representations at the textual surface level are identical to conventional texts. However, the network structure encourages the reader to exit the predetermined linearity and enter into alternative thematic threads.

Beyond this type of knowledge (re)presentation, hypertexts are associated with a series of additional advantages. For one, hypertexts provide the possibility of conveying additional key competences (such as research competence or media competence) which, among others, are relevant to an educational setting (Roche 2007, Roche/Reher/Simic 2012). Consequently, teachers can use hypertexts in class as tools to organize large data amounts in one subject area in an interlinked form (see hypertext example according to Suñer/Springer 2012). In addition, they can incorporate hypertexts into teaching materials which the learner works through or expands on in collaboration with others (cf. *Cmaps Tool* in Chapter 6.3.3 for creating concept maps). Two, language and images can be combined in hypertexts to promote comprehension (cf. Roche 2007, 2013a) and to enable the construction of comprehensive mental models through the inclusion of pictorial and verbal channels (cf. Mayer 2009, Schnotz 2005). Providing word explanations in different modes (image + text, image + audio, only image), for instance, helps address different needs of various learner types (Plass/Jones 2005). Three, hypertexts fundamentally provide a higher degree of learner adaptability through their openness in terms of the **individual differences principle** (Jones/Plass 2005). The presentation of the information is adapted optimally to the learners' learning preferences and their individual traits through appropriate instructional design measures (for instance, with respect to interests and attitudes, Leutner, Barthel/Schreiber 2001; also cf. Leutner 2002, Roche 2007, 2013a; on the capacity of the working memory, Lee/Tedder 2003).

Despite the apparent advantages, there is no definite proof that indicates learning from hypertexts is preferable to learning from linear texts (cf.

Henry 1995, Chen/Rada 1996, Unz 2000, Naumann/Waniek/Krems 2001, McEneaney 2003). Rather, it has become evident that hypertexts may produce an added value but that the extent of the added value cannot be determined solely through the comparison of different formats of texts (Müller-Kalthoff 2006; cf. Roche 2008, Plass 2005). For this reason, the research of the last ten years has focused more intently on the problems surrounding learning with hypertexts and possible solutions with respect to the interaction of learner and medium (cf. Cuddihy/Spyridakis 2012, Calisir/Eryazici/Lehto 2008, Antonenko/Niederhauser 2010, Klois/Segers/Verhoeven 2013, Madrid/van Oostendorp/Puerta 2009, Salmerón/Baccino/Canas 2009, DeStefano/LeFevre 2007, Brunstein/Krems 2005, Brünken/Seufert/Zander 2005, Richter/Naumann/Brunner/Christmann 2005, Möller/Müller-Kalthoff 2000, Potelle/Rouet 2003, Gerjets/Scheiter/Schuh 2005). The current state of research is the subject of the following section.

5.3.5 Problems and Solution Approaches

Hypertexts place high demands on learners in terms of structural and conceptual complexity, under some circumstances such pressure can have an inhibitory effect on learning. Learners have to perform a kind of dual task activity (cf. Wenger/Payne 1996) when handling hypertexts: in addition to forming a mental model of the text, learners also need to develop a mental map to orient themselves within the structure of the hypertext (Schnotz 2005, Ohler/Nieding 2000). If the dual task activity exceeds the memory capacity, the learner is easily disoriented (called 'lost in hyperspace'; cf. Conklin 1987), leading to a decline of learning results. There are several partial aspects contributing to disorientation, according to Gerdes (1997: 103): difficulties in determining the standpoint within the hypertext, indecision in terms of the optimal reading path and how to continue, lack of oversight over the extent and size of the hypertext, insecurity in terms of reading all of the relevant nodes in the hypertext, forgetting the planned-out path, impossibility of returning to a previously perused node, etc. (also cf. Kuhlen 1991). We must also differentiate between conceptual and structural disorientation in this regard (Tergan 2002, Calvi/de Bra 1997), even though, from a cognitive perspective, types of disorientation are not always clearly distinguishable from one another (cf. Müller-Kalthoff 2006).

Conceptual disorientation mainly involves difficulties in creating global coherence (also cf. macrostructure) between the hypertext nodes via navigational choices. Conceptual disorientation is, therefore, connected to the conceptual difficulty of the presented materials. For this reason, Sweller & Chandler (1991) view it as a partial aspect of intrinsic cognitive load. Even though the creation of global coherence is also a necessity for conventional texts, it takes place under completely different circumstances due to the (pre-)linearization of the text parts (Conklin 1987, Wenger/Payne 1996; also cf. Ohler/Nieding 2000, Krems 2001). With hypertexts, readers are encouraged at every node to contemplate the different options for continuation and to initiate appropriate anticipatory processes in the form of hypotheses and search queries (cf. Roche 2007: 169, Foltz 1996; also cf. process model according to DeStefano/LeFevre 2007). In order to promote this process and to avoid an excessive use of cognitive resources during navigation, Antonenko & Niederhauser (2010) studied how providing a preview in form of a small summary of hypertext nodes ('leads'; cf. Figure 5.11) affected text processing and cognitive load. In the learning phase, the study participants worked with texts with and without leads. The participants' cognitive load was measured with an electroencephalogram and the learning performance was tested with three different performance tests (free reproduction of content, a concept mapping task on structural knowledge and a multiple-choice test on knowledge specific to the domain). The results of the study were that the use of leads significantly reduces the neuronal activity in the brain areas that are associated with dividing attention and, therefore, are also associated with higher cognitive load. In addition, the study participants were able to achieve significantly better results in terms of acquiring structural and domain-specific knowledge. A similar study by Madrid et al. (2009) tested to what extent the presence of navigational hints and the increasing number of links per node affected cognitive load and learning performance. The results showed that navigational pointers accompany significantly higher learning performances and that the number of links per node had no effect on learning performance. The authors found instead that the sequential order of the links plays a much more important role than originally thought. In addition, Bezdan, Kester & Kirschner (2013) found that limiting links within a hypertext, in order to let the reader control the navigation, results in a poorer learning performance.

The research field that investigates the effect of hypertext structures as well as graphic overviews of navigation surfaces on learning is very broad. In this field of research, prior knowledge as a dimension of learning is very important. With respect to the aspect of prior knowledge, the study by Amadieu et al. (2009) shows that mainly hierarchical hypertext structures with organizational links (see Figure 5.9b) are suitable for learners with little prior knowledge, network-like hypertext structures with referential links (see Figure 5.9d) are, on the other hand, especially appropriate for learners with a high degree of prior knowledge. Salmerón et al. (2009) also observed that the use of graphic overviews results in significantly better learning performances, as simpler hypertexts are perused towards the end of the learning phase. Overall, we can say that learners with a low degree of prior knowledge profit more from hierarchically structured and less detailed navigational interfaces than learners with a high degree of prior knowledge (cf. Möller/Müller-Kalthoff 2006, Calisir/Gurel 2003, Potelle/Rouet 2003). This is also true for hypertext structures in general (cf. Dee-Lucas/Larkin 1995, Gerdes 1997, Schnotz/Zink 1997, McNamara/Shapiro 2005, Suñer 2011).

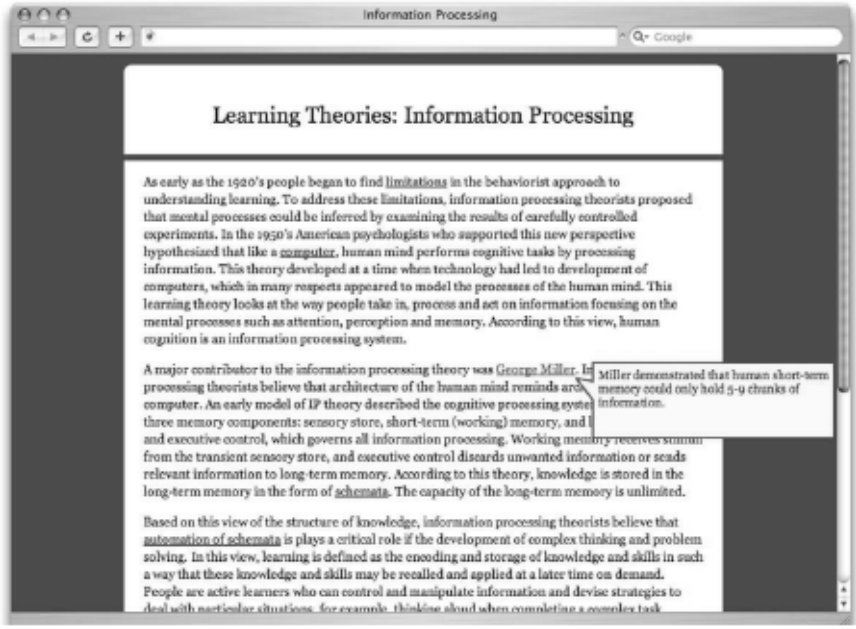


Figure 5.11: First part of a text with a number of hypertext nodes (Antonenko/Niederhauser 2010: 144)

In contrast to conceptual disorientation, **structural disorientation** refers to the lack of knowledge in terms of outline, i.e., on the organizational structure of a hypertext (cf. Müller-Kalthoff 2006: 30, Tergan 2002). Structural disorientation may, therefore, have the effect that the learner is unable to pinpoint his or her position within the hypertext and is unable to tell which nodes have already been visited (cf. Plötzner/Härder 2001). Within the cognitive load theory by Sweller & Chandler (1991; cf. Chapter 7.1) this type of disorientation is connected to "extraneous cognitive load". Extraneous cognitive load can be reduced by the implementation of appropriate instructional design measures. However, many different instructional solutions have been tested in this regard, with varying success. Walhout, Brand-Gruwel & Jarodzka (2015) have studied whether navigation using a "tag cloud" (of a varying size depending on the importance of the items) results in better learning performances than a navigation with a hierarchical navigation menu. Their results show that tag clouds lead to a comparatively stronger goal-oriented navigation than hierarchical navigation menus, but have no effect on learning performance. Cuddihy & Spyridakis (2012), in contrast, were able to show how study participants attained better results when the navigation within articles of a website was clearly visually distinguishable from the global navigation of the page (see Figure 5.12).

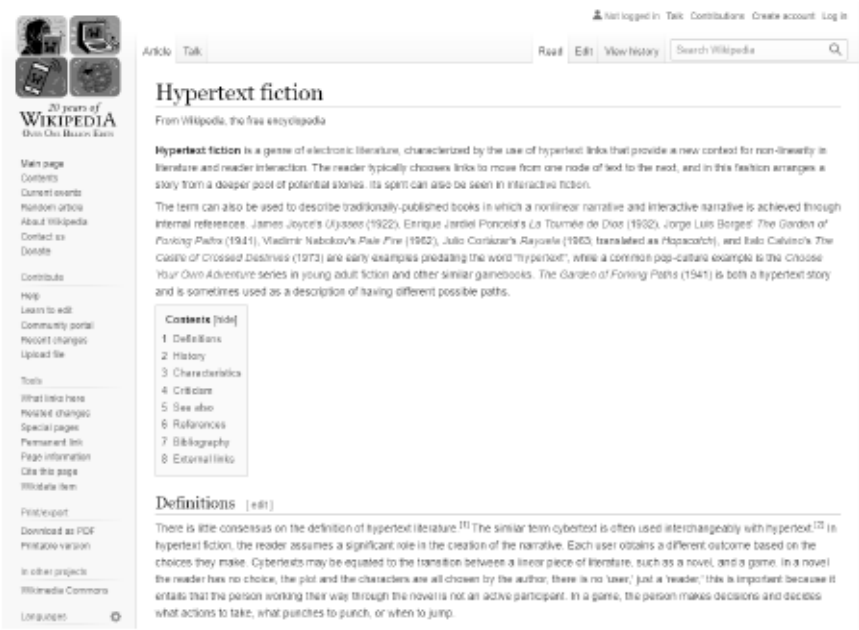


Figure 5.12: Example of a visual emphasis of the menu within a website article (Wikipedia 2021)

In terms of learning with this form of media, hypertexts demand a higher cognitive effort from the learner in comparison to linear texts. This is particularly true with respect to orientation within the learning material, as well as with respect to creating coherence at a macrostructural level (Ohler/Nieding 2000, Krems 2001; also cf. Bannert 2003). Learning with hypertexts is, therefore, more likely to result in the memory capacities being exceeded and in the learning-inhibiting effects associated with cognitive overload. Furthermore, current research has shown that mere comparisons of text formats (Müller-Kalthoff 2006) are not very enlightening. Factors such as hypertext structure and a learner's prior knowledge are much more important when researching interactions with hypertexts. This last factor, however, only pertains to domain-specific knowledge on a subject. Today, we can expect readers to have at least a bare minimum of media experience in our increasingly hypermedialized societies (cf. Bannert 2007: 87). As we have already seen, research attributes special meaning to the aspects of disorientation and their respective solutions. Despite many studies, we know relatively little about the actual effect of disorientation

on learning. This is in part due to the heterogenous operationalization of the constructs of disorientation and the constructs of text comprehension in studies up to this point (cf. Heiß 2007: 103). In particular, the different dimensions of text comprehension (textual surface, text base, and mental model; cf. Kintsch 1998) are rarely named in a clear manner, resulting in a strong reduction of the construct validity of tests on text comprehension.

5.3.6 Using Hypertexts in Class

Hypertextual collections of material also provide the possibility of being expanded by the reader in the form of an externalized knowledge network. In this context, Suñer & Springer (2012) presented a proposal for the hypertextual processing of historic sources on the subject of "the Euro crisis" for teaching culture. The authors assume that the hypertextual form is especially appropriate to the multimediality of historic sources alongside the often network-like character of historical issues. In this hypertext example (see Figure 5.13), the macrostructure of the topic is presented by means of a concept map which functions as a navigational interface and, at the same time, as an orientational aid for the learner. Every clickable node contains either text, audio, or video materials and tasks. The many different export options make it possible to use the entire hypertext as a website, or as an interactive PDF in class. The most attractive feature, however, is the feature enabling learners to use the provided hypertext through the server of *CMaps Tool* to individually or collaboratively supplement and expand it at will. Hypertexts are open and dynamic knowledge structures providing the possibility of multiperspectivity and access to complex subjects, as well as integrating the learner's individual insights into the knowledge structure, through which "the construction of an individualized and strongly interwoven cultural understanding by the learner can be encouraged" (translated from Suñer/Springer 2012: 13). Also, the use of such hypertexts as visualizations and representational tools for additional research tasks can promote media and methodological competence (conceptional abilities, problem-solving abilities, holistic thinking). Still, we must emphasize that these types of hypertextual learning environments are not always immediately accessible to the learner, due to their complexity. Therefore, we recommend using hypertexts as teacher-led presentations and to add instructions for a worked example gradually. It is only as a subsequent second

step that learners should be encouraged to produce visualizations themselves (cf. Suñer/Springer 2012: 13).

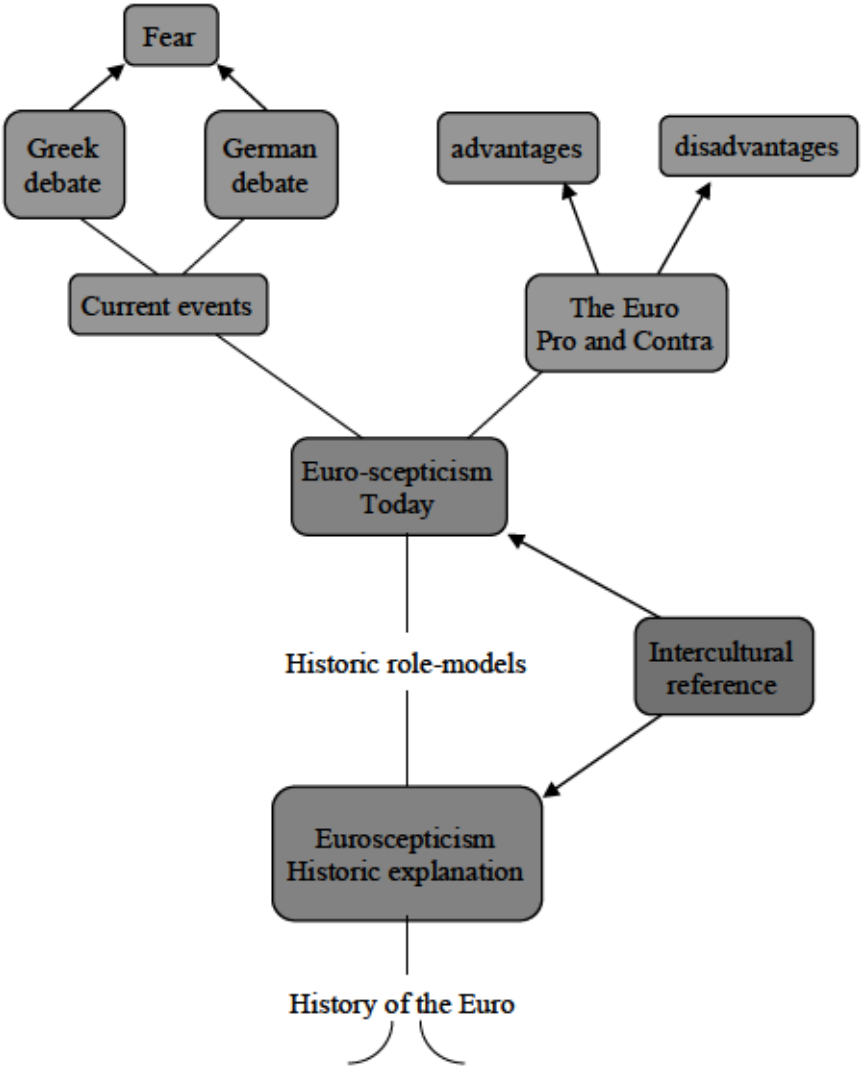


Figure 5.13: Hypertext "the Euro crisis" (based on Suñer/Springer 2012)

Experiment

Try to depict the hypertextual structure underlying the following hypertextual nodes as an example. These nodes describe the features of a **mind map tool** for educational purposes.

LEARN

Train your mind and learn new things even faster.

TEACH

Use Mind Maps with your students for brainstorming, essay planning, book summaries, evidence-gathering and more.

WORK TOGETHER

Team colleagues learn from each other, some identify important points, others recognize the connections and generate new ideas.

ENROLL

Easy registration for students without e-mail or with an access code. LTI, Google Classroom and Office 365 integrations available.

Mind Map Tasks

Create assignments where students can work alone or in groups to create mind maps that are shared instantly.

Change History

Track all the changes each student makes on a mind map: added topics, new connections, uploaded pictures and videos, and more.

Student work rating

The grading feature allows you to evaluate student activity and save all grades in a downloadable report.

Real-time collaboration

Students can work together on the same mind map at the same time and see the changes in real time.

Order feedback

Provide timely feedback to students to clearly inform them about their performance and improve it.

Live chat

If you are working from a different location, students can discuss directly on the mind map in the chat area.

Understand the course material

Understand how concepts are interrelated and discover new relationships and patterns.

Review and memorize

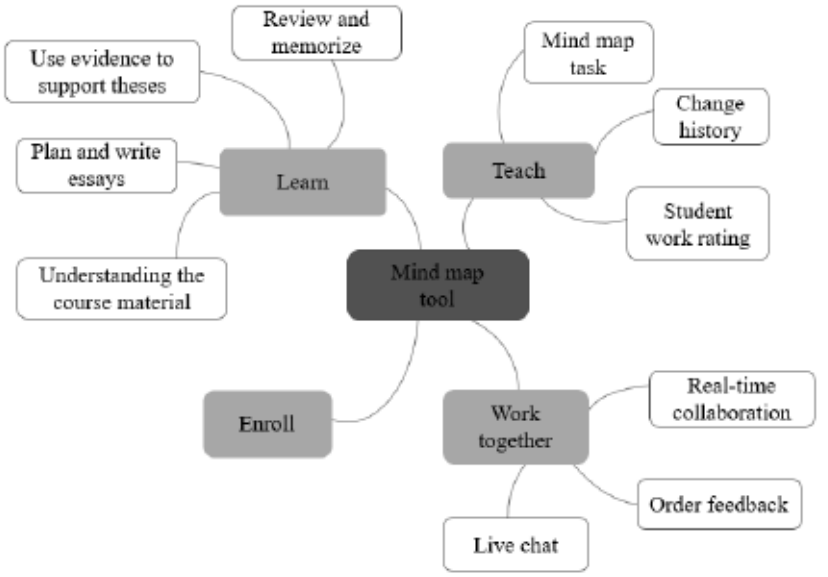
Use mind maps – short words, images and links improve the way you store and retrieve information.

Plan and write essays

Structure your essays in a mind map format. Create a real-time editable structure from the mind map and start writing.

Use evidence to support theses

Develop a thesis by adding branches with proofs of its correctness. Then add files, web links, pictures, and videos as supporting evidence.



Source: www.mindomo.com
Sample Solution: Mind-Map depicting the features of the tool mindomo (www.mindomo.com)

5.3.7 Summary

- Hypertexts consist of nodes and references. The nodes contain content that is connected by links according to varying content-based criteria.
- The structure of hypertexts strongly depends on the type of links connecting the nodes and is crucial to how much freedom the readers have in choosing the order of the nodes.
- A purely electronic realization is not sufficient as a distinguishing feature of hypertexts and should not be regarded as such. E-books or articles of electronic magazines, for example, are not substantially different to conventional texts, as they could just as well be printed.
- The manifestation of text links, a new form of connecting text, and the requirement of readers operationalize hypertexts themselves as

well as the resulting interactivity are the constitutive features of hypertexts.

- The high requirements a hypertext demands on the reader with respect to structural and conceptual complexity may in some circumstances have a learning-inhibiting effect.
- Through the fragmentation of information, multiperspectivity, and the required text-learner interaction, hypertexts provide diverse applications for teaching practice.

5.3.8 Review Questions

1. What is the difference between organizational and referential links?
2. Why is electronic realization not a constitutive feature of hypertexts?
3. What features define the term hypertext?
4. What are the potentials of learning with hypertexts?
5. What are the problems of learning with hypertexts?

6 Text and Image Processing

Human communication is rarely purely language-based. In fact, we can assume our communication incorporates at least one additional coding system apart from the linguistic system. In verbal communication, gestures and facial expressions fulfill an essential function and create coherence. An example for this is how we usually illustrate spatial aspects using our hands. However, it sometimes happens that gestures are misinterpreted based on different cultural backgrounds. Shaking one's head, for instance, is a gesture of agreement in many cultures but a gesture of disagreement in many others. Written communication also incorporates different coding systems, pictures (photographs, diagrams, symbols, emojis, etc.) being especially important. This is especially evident in the fields of advertisement, press, or virtual communication. It seems logical, therefore, to promote adequate strategies and skills for dealing with images and other elements of nonverbal communication in the context of language and culture teaching. After having dealt with the cognitive aspects of the linguistic system, language acquisition, and text processing in previous chapters, we now want to turn to the question of what special features text and visual image processing exhibit in a foreign language. At the centre of this chapter are L2-specific aspects of text and image processing in the context of general communication, as well as success factors in the use of text and images in learning materials. In order to discuss those aspects, we will first describe the basic processes of image and text processing in the working memory, while at the same time referring back to relevant models of cognitive psychology.

6.1 Images, Language, and Memory – Basic Theories of the Working Memory

The terms multimedia and multimodal seem to be everywhere nowadays when software developers try to determine the most important features of new media in relation to language teaching. In doing so, some people tend to confuse basic concepts, as the terms are so similar. In reality, the terms denote completely different aspects of text and image processing (cf. Mayer 2002): multimediality refers to the use or processing of differently coded information (such as linguistic information and image-based information); multimodality, on the other hand, refers to the information processing of two or more sensory modalities (such as the visual modality or auditory modality). The interplay of differently coded information and different sensory modalities may provide great potential from a cognitive point of view, but can result in impeded information processing. Combining text, imagesand learning with the use of all our senses is seductive and sounds promising. However, many teachers and authors of online courses cannot explain exactly under what circumstances we may expect actual success. It is often neglected that the multimodal enhancement of learning materials may lead to the opposite effect and actually hamper learning. For this reason, this chapter tackles mechanisms within the working memory responsible for assembling the various pieces of information to a coherent ensemble during text and image processing. Also, it addresses the circumstances responsible for the processing of overload capacities.

Study Goals

By the end of this chapter, you will:

- understand and be able to explain the processing of language and images
- be able to evaluate what forms of information presentation is most effective in terms of comprehension and learning processes
- be familiar with empirical findings on these issues.

6.1.1 Basic Terms of Text and Image Processing

Before we discuss selected models for text and image processing, we will look at the greatest differences between pictorial and linguistic information. According to Schnotz (2005), language is often much more suitable for describing abstract concepts than pictures. Abstract terms such as *jealousy* and *friendship* are more effectively put into words than into pictures, as these often invoke other interpretations. An additional difference, according to Paivo (2007), lies in the type of processing: at the textual surface (cf. Kintsch 1998), language is processed sequentially, among other ways, due to the spatial linearization of visual stimuli in written texts as well as the temporal sequencing of auditory stimuli in verbal communication. In contrast, images are processed synchronously. A simultaneous processing of several elements is possible and a processing from left to right, as with text, is not necessary (Paivio 2007, Schmitz 2011). Furthermore, images can be stored and retrieved holistically (Engelkamp/Zimmer 2006). Image-coded information is more easily retrieved in its complete form as a mental image than in the form of language-based information, which needs to be made available by reconstructing the propositional content (cf. Scheller 2009; also cf. the levels of text comprehension according to Kintsch 1998 and Schnotz 2006). After all, images establish concepts in a direct way (experiences can be stored as mental images), while language as a system of symbols can only refer to them indirectly (cf. Engelkamp/Zimmer 2006).

However, processing and storage, as well as the processes of retrieving text and visual information, can only be truly understood by referring back to the various components of the human memory. When we memorize something, the memory capacity used may be very different, depending on the place of storage. Information is only temporarily stored in the **working memory**, while the long-term memory retains information for longer periods. The most influential model of the human memory to date (Baddeley 1986) refers to several previous models (Broadbent 1958, Atkinson/Shiffrin 1968) and makes a distinction between the sensory memory (perception), the working memory (focus of attention) and the long-term memory (see Figure 6.1). Baddeley's model focuses on the description of the working memory: a link between the sensory memory register and the long-term memory (cf. Baddeley 2003: 829) (see Figure 6.1). Baddeley distinguishes between two components responsible for language and image processing respectively: the **phonological loop** and the **visuo spatial**

sketchpad. A third component of the working memory is the episodic buffer, a component linking necessary knowledge from the long-term memory. The necessary knowledge is then available for further processing for a short period of time. The central executive, a component responsible for all complex processing tasks, coordinates the phonological loop and visual-spatial sketchpad and is also responsible for deciding which impulses or tasks to focus on. The central executive in particular springs into action when the routine controls are overtaxed (cf. Baddeley 2003: 835).

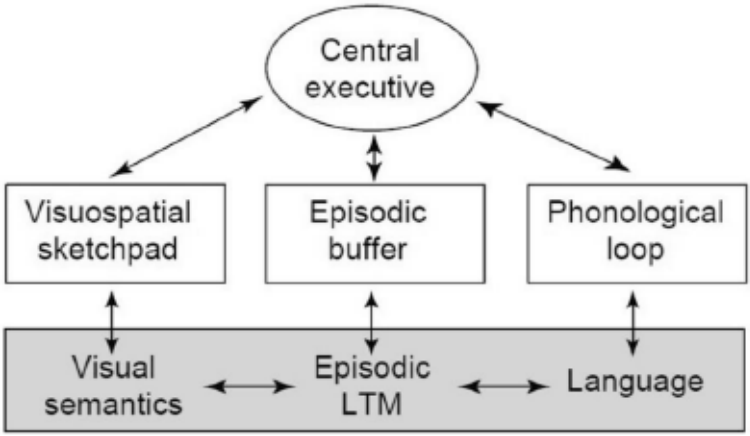


Figure 6.1: Model of the working memory (according to Baddeley 2000: 421)

How do the various components interact with each other? According to Baddeley (1986, 2003), the successfully perceived stimuli are first transferred to the working memory in the form of information units. There, they are generally processed further with the aid of prior knowledge repositories from the episodic buffer. If the newly acquired information is easily processed through existing information from the prior knowledge repository, **assimilation** takes place (new knowledge is processed in the context of existing knowledge structures). However, if the new information strongly diverges from prior knowledge, **accommodation** (adaptation) of the prior knowledge repositories sets in. In both processing directions a deliberate act of directing the speaker's attention is necessary for information processing to occur. If the perceived stimuli are not further attended to in the working memory, they are usually lost, even if they are available for several seconds.

The fact that such information remains available for a few seconds even when a speaker is not fully concentrated on the task can be seen in situations where the conversational partner is not really listening to a speaker (this sometimes happens in classrooms, too). If the addressee is then asked to repeat what the speaker just has said, an addressee is often able to recite the last few words or a sentence. According to the **recency effect** (Hoffmann/Engelkamp 2013), the last few words are retained in the working memory as they are perceived as stimuli in the sensory memory without necessitating any particular attention processes. Consequently, this means repeating the last few words of an utterance generally does not reliably prove attentive listening. Also, a person usually retains items processed first rather than items in the middle of a series according to the **primacy effect** (Hoffmann/Engelkamp 2013). In other words, the position of the items in a series often influences memory.

Hoffmann & Engelkamp (2013) present these two serial position effects as seen here:

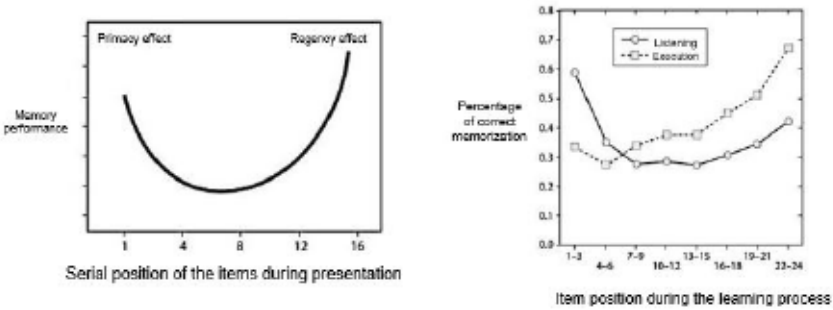


Figure 6.2: Memory performance and number of correct recalls in terms of the position in the presentation (following Hofmann/Engelkamp 2013: 148)

In the second graph, we see how the serialization of items while listening and acting (execution of action phrases) affects memory in different ways. The listening results exhibit a greater effect in the beginning than action. It is only after the fourth or sixth position that the effect of action surpasses the effect of listening. A similar phenomenon in word processing is known as the **bathtub effect** (cf. Aitchison 1997). This leads us to an important question regarding the application of these findings to teaching: are teachers really supposed to monitor such things as the serialization of information or individual words in a text? Definitely not: the relevance of these

results are of a more general character. First of all, these effects show how important it is to connect language with concrete actions. Furthermore, fundamental linguistic principles can be explained by these effects. For instance, initial and final positions in sentences usually draw the most attention. Some languages, e.g., German, provide the possibility to place virtually any element in a sentence in the first position in order to make it salient. Similarly, various post-positions, including extensions after the completion of a sentence, can produce the same effect (cf. Chiarcos 2011, Vinckel-Roisin 2011).

Experiment 1

We will now introduce you to an additional processing phenomenon of the working memory. Conduct the following experiment: ask a friend to think about a random number consisting of ten digits you have written down on a piece of paper beforehand. Afterwards they also have to write down the number, but only after you have covered the number for about five seconds. Then ask your friend, what they were doing during those five seconds? How do you explain their behavior during these five seconds?

As you have probably realized during this experiment, inner speech can contribute to the memory performance of the working memory (cf. Hayes 2006), especially for elements with no apparent correlation and no relation to information stored in the prior knowledge repositories, so that the digits cannot be reconstructed later. To a certain degree, elaborative memorization can ensure the retention of such elements in the working memory. For example, in the case of a work telephone number the first three digits are often the area code, the next approximately four digits are the fixed order of all numbers in the company or in a particular unit of the company or institution, and only the last few digits represent the phone extension. This type of processing strategy is known as **chunking** (cf. Ericsson 2003: Chapter 3.3). The following chapters present additional processing strategies, for example the clustering effect.

6.1.2 Organization and Integration of Text and Images into the Working Memory

In this section, we will first outline two specialized components of the working memory, the phonological loop and the visuospatial sketchpad. Only then do we turn to scrutinize the interaction between the processes of text-based and visual information.

The phonological loop possesses a storage capable of retaining words for several seconds, as well as an articulatory control process, with the ability of possibly increasing memory performance through internal speaking and other processing strategies. Various effects, such as the word-length effect (cf. Longoni/Richardson/Aiello 1993) or the phonological similarity effect (cf. Baddeley 2003) give insight into the circumstances of our memory span (memory performance), enhanced or decreased by the phonological loop. The first effect shows how the memory span of the phonological loop is reduced for qualitatively higher articulatory complexity (cf. for instance Longoni et al. 1993). The phonological similarity effect, on the other hand, explains why the repetition of phonologically similar items is more difficult due to the greater effort involved when differentiating between them, compared to when phonologically non-similar items are reproduced (cf. Baddeley 2003). What is considered to be the most important function of the phonological loop is the second-by-second memory of phonological information (such as sounds), as well as refreshing the information through inner speech as well as processing and storing words recorded in writing (cf. Grabe 2009: 34). Several examinations (cf. Carpenter/Miyake/Just 1995, Gathercole/Baddeley 1993) found that this function of the phonological loop typically takes effect when storing the phonological information of new words, but is insignificant for the retention of known words (cf. Baddeley/Gathercole/Papagno 1998, Eysenck 2004). The phonological loop, therefore, seems to be mainly important to the acquisition of new vocabulary.

The second specialized component, the visuospatial sketchpad, is responsible for processing information such as colors, forms, and spatial representations of objects and is, similar to the phonological loop, limited in the number of items it can process (cf. Baddeley 2003). According to Logie (1995) the visuospatial sketchpad also includes two subcomponents: visual information on objects, such as colors and forms, is stored in the **visual cache**. The **inner scribe**, on the other hand, processes spatial and dynamic

aspects, such as the spatial relations of objects or the dynamic aspects of movement sequences (also cf. Kelle/Grimm 2005). Analogous to the phonological loop, the inner scribe has the function of refreshing the information in the visual cache and, afterwards, transferring it to the central executive (cf. Eysenck 2004: 299).

In the next section, we will see how Baddeley's (1986, 2000) model serves as a basis for subsequent models of multimedia learning. However, it leaves several questions unanswered, according to Suñer (2011: 91): one, the model describes the functioning of the perhaps most important component of the working memory, the central executive, quite vaguely. Two, the model says little about the relationship of coding (language and images) and sensory modalities (auditory and visual) to each other. Three, the model does not explain through what processes language and images are joined together to a holistic mental representation (cf. Allen/Hitch/Baddeley 2009). Paivio's (1990) **dual coding theory** predominantly focuses on the last two aspects. According to Paivio, we must distinguish between two basic types of information representation processed in two separate subsystems: logogens (words) and imagens (images). The respective information units can not only be described in relation to the format of their representation, but they also contain a sensory-motor coupling component allowing for a modality-specific form of processing (visual, auditory, haptic, gustatory, and olfactory). By distinguishing between coding and modality, the model opens up a broad palette of combinatory possibilities, whose complexity does more justice to multimedia processing than Baddeley's model. Even though information is initially processed concretely and modality-specific, it can be later joined with or combined into more complex entities, independent from modalities (cf. Paivio 1990: 59). Such an entity is created, for example, when we read a brochure on evacuation procedures in the case of fire containing both text and pictures, and subsequently imagine how we would act in a concrete situation.

How exactly does this assembly of information take place? Paivio (1990; also cf. Sadoski/Paivio 2004) proposes three types of processes all in all: representational, referential, and associative processes. Representational processes take place when linguistic stimuli evoke the appropriate verbal representation in the working memory (for example when reading a text or when hearing words). In the case of referential processes, verbal stimuli activate non-verbal representations and vice-versa. This means, in other

words, the mental image subsequently generated as a result of the processing of the respective stimuli in the nonverbal system evokes the respective word in the verbal system through referential processes. In contrast to words, images, as a rule, also evoke linguistic denotations (Paivio 1990). They are, therefore, often processed dually. This explains the **picture superiority effect** (also cf. Hoffmann/Engelkamp 2013: 168). On the other hand, words are less often double-coded. As a consequence, they are less strongly connected to the respective mental images. Other approaches, such as the multimodal memory theory by Engelkamp & Zimmer (2006), explain the superiority effect of visual information by referring to the direct access of images and their referents in the episodic memory. Finally, associative processes for other representations are activated within the same subsystem (verbal or nonverbal), such as the activation of various words sharing certain phonological characteristics, or the activation of mental images of objects generally found in offices (cf. Paivio 1990: 69, Sadoski/Paivio 2004: 13). All of these processes are incorporated into later models in order to derive concrete instructional design principles (cf. Schnotz 2005, Mayer 2009).

6.1.3 The Limits of Text and Image Processing in the Working Memory

As we have seen, the working memory cannot process information simultaneously to an unlimited degree. In this section, we will discuss under what circumstances the working memory is overtaxed and what instructional measures can be used to alleviate this. In this regard we will refer to the **cognitive load theory,** CLT) by Sweller & Chandler (1991; also cf. Sweller 1988, 2005).

The cognitive load theory by Sweller & Chandler (1991; also Sweller/Chandler 1994, Sweller 1988, 2005) deals with the use of cognitive resources in learning situations (mainly in problem-solving situations) to formulate instructional design principles for the optimal use of the working memory's limited capacity. In that sense, cognitive load theory should not be regarded as a general learning theory like Anderson's adaptive control of thought theory (ACT 1983), but as a capacity theory (cf. Brünken/Plass/Leutner 2004). While the cognitive load theory utilizes its predecessors from the same field as a foundation (such as Baddeley 1986),

it refines the older theories in many ways. Sweller (2004, 2005) for instance, rejects the existence of the central executive in working memory due to a lack of empirical evidence, a concept Baddeley postulated. Instead, he attributes monitoring and control functions, in addition to others, to existing knowledge structures. The existing knowledge structures use these functions to check their compatibility with new information using prior knowledge, which then inititates the appropriate assimilation or accommodation processes. In this sense the cognitive structures of long-term memory, often regarded as schemas, fulfill three important functions (Seel 2000; also cf. Mandl/Friedrich/Hron 1988): first, they supply knowledge templates for drawing purposeful conclusions from new information and in this way avoid uninhibited associating (such as through anticipatory thinking processes while reading). Second, they supply a type of recognition pattern the learner can use to orient themselves when processing incoming new information and help focus the learner's attention on relevant features with more precision (such as the search for new information within a text). Third, they support the storage and retrieval of information by providing an interpretational frame creating coherence. Through the use of such schematic-theoretical findings, cognitive load theory can explain the transfer of knowledge from the working memory to the long-term memory more precisely and is able to formulate more reliable statements on learning.

The cognitive load theory assumes that the learners use up cognitive resources when working on learning exercises, which results in a cognitive burden or load. According to this theory, three types of cognitive loads are relevant (Sweller/Chandler 1991; also cf. Sweller/Chandler 1994): **extraneous cognitive load, intrinsic cognitive load,** and **germane cognitive load**. Extraneous cognitive load refers to all types of cognitive resource expenditure, even when used while working on a task, which do not contribute to knowledge acquisition. When a map does not provide a map legend on the same page, the reader must use additional cognitive resources in order to mentally integrate the facts in their entirety. A physically integrated representation of all information of a situation in terms of the contiguity principle (cf. Mayer 2009) would contribute to reducing the extraneous cognitive load. In this regard, the use of superfluous effects in the presentation of content is to be avoided, as they do not directly contribute to a better understanding of the learning material. Next, the intrinsic cognitive load refers to the difficulty of the newly learned material or issues

and the associated consumption of cognitive resources (Sweller 2005). Aspects such as the extent and the complexity of the material or issues plays an important role. As we have already learned, the complexity or the extent of the information meant to be processed is reduced depending on the level of prior knowledge, for example, through chunking (cf. Ericsson 2003). Intrinsic cognitive load is, therefore, also dependent on a learner's prior knowledge (cf. Renkl 2005: 242, Sweller/van Merriënboer/Paas 1998). Tasks demanding a simultaneous processing of several elements (such as working out the argumentation strategy of a text) are principally connected to a higher intrinsic load than tasks enabling serial processing (such as filling out an application form). Finally, all cognitive resources used for schema construction and are, therefore, most relevant to the learning process, represent the germane cognitive load. When reading scientific texts, we expend certain cognitive resources for tasks beyond merely decyphering a text, such as drawing conclusions from research results and thereby gaining a more thorough understanding. As the three types of cognitive loads are additive, the instructional design should ensure that the capacity of the working memory is not exceeded as a whole. In other words, in case a learning task demands a high germane cognitive load, the extraneous cognitive load should be kept as low as possible (cf. Sweller 2005; also cf. Brünken et al. 2004). With its three types of cognitive load, the cognitive load theory provides a productive theoretical framework for developing learning materials. This framework supports various specific aspects of the learning process. However, the success of these instructional measures depends on additional dimensions of learning, mainly the learner's prior knowledge. In the next section, we will look at how the level of prior knowledge affects the different types of cognitive loads and what instructional consequences may follow from such effects.

6.1.4 How Does Instructional Design Influence Cognitive Load?

As we have seen, cognitive load is not always a factor that inhibits learning. In many cases, it is an important foundation for setting deeper learning processes into motion and thereby enabling sustainable learning. In contrast to the extraneous and intrinsic cognitive load, the germane cognitive load produced by instruction can often only be influenced indirectly. For this reason, instructional design often revolves around issues concerning the extent of the germane cognitive load and how it can be increased by

reducing the two other types of cognitive loads. For example, researchers have tried to integrate multimedia learning materials temporally and physically to reduce the extraneous cognitive load as much as possible and thereby free up cognitive resources for increasing the germane cognitive load (cf. Seufert/Brünken 2006). However, Mayer (2009) notes that merely freeing up cognitive resources does not automatically result in them being used to increase the germane cognitive load. Researchers also found that the learner's prior knowledge level creates great differences in the cognitive load. For instance, experts can retrieve knowledge relatively automatically during problem-solving tasks and, therefore, can devote more cognitive resources to solving learning tasks than novices (cf. Plass et. al. 2010). The possible negative effects of extraneous cognitive load during learning would be very low in cases such as these (cf. Sweller/Chandler 1991, Sweller et al. 1998). With this in mind, instructional design measures were developed and evaluated empirically. They can be used to increase or reduce the different types of cognitive load. They are meant to be tailored towards the learner's level of prior knowledge.

Experiment 2	
Be honest: which of the following sentences is easier to understand?	
A business is a systematically organized economical unit which produces material goods and provides services.	*The CEFR has been criticized for not giving enough consideration to cultural competences.*

Several studies have shown how presentations in the form of worked examples, for instance, are especially effective (cf. Paas/van Merriënboer 1994, Miller/Lehmann/Koedinger 1999). According to Ayres (2012: 3467), a **worked example** is defined as,

> provid[ing] a step-by-step solution to a problem or a task. The *worked example effect* occurs when learning is enhanced by studying 'worked examples' to problems rather than by trying to solve the original problems. It is a form of *direct instruction*. (Emphasis in the original, also cf. Renkl 2005: 242).

The use of these steps and the presence of a solution promotes the storage and organization of knowledge in the form of complex schemas and reduces the cognitive load in the working memory, especially for novices (cf. Sweller et al. 1998, 273, Sweller 2004, 2005, van Merriënboer 1990, van Merriënboer/de Croock 1992, Paas 1992, Paas/van Merriënboer 1994, van Merriënboer/Schuurman/Croock/Paas 2002). Regarding the role of prior knowledge, the empirical state of research so far clearly shows the positive effect decreasing in learners with high levels of prior knowledge. This decrease, in part, results in performance losses because providing worked examples in this case generates unnecessary redundancies (cf. Kalyuga/Chandler/Tuovinen/Sweller 2001, Kalyuga/Ayres/Chandler/ Sweller 2003, Reisslein/Atkinson/Seeling/Reisslein 2006). This counter-effect is also known as **expertise reversal effect** (cf. Kalyuga 2014) and underlines how important prior knowledge is for planning and implementing instructional design measures. Researchers have observed similar effects in many studies meaning to reduce the complexity of hypertexts by representing various graphic overviews as functioning in the form of navigational surfaces. The results also show how structured overviews are more likely to be helpful for novices whereas network-like overviews were more likely to be helpful for experts (cf. Amadieu/Tricot/Mariné 2009). The authors formulate instructional design measures specifically for promoting or reducing the various types of cognitive load, often in the form of principles (cf. Mayer 2009, van Merriënboer/Sweller 2010). All in all, we can count about 30 identified principles for optimizing cognitive load. However, applying these principles is associated with certain problems in the context of language teaching. For one, the efficiency of most of the principles was only tested in studies in which the L1 speakers occupied themselves with specialized subjects such as chemistry, biology, physics, and so on. A few later studies found such results could not be automatically reapplied to the situation of learning foreign languages (cf. for instance Suñer 2011, Mitterer/McQueen 2009). Secondly, it is not always evident in the research literature which type of cognitive load can be increased or reduced with which instructional design feature. According to Mayer (2009), the modality principle (arguing that the presentation of text and images in two, rather than one sensory modality is more beneficial for learning) reduces the intrinsic cognitive load (c.f. Mayer 2009 **essential processing**). However, according to van Merriënboer & Sweller (2010) this principle is used for reducing extraneous cognitive load.

Overall, empirical research on instructional design shows that learning is dependent on learners' prior knowledge and corresponds differently to instruction and construction measures (cf. Reinmann/Mandl 2006). If complex tasks with high intrinsic cognitive loads are not supported by instructional aids or adapted teaching and learning arrangements, a decrease in performance can be expected, especially in novice learners. On the other hand, if expert learners are offered too many aids, construction processes are unnecessarily delayed. For this reason, instructional design principles are the subject of the next chapter, specifically in terms of their interaction with a learner's prior knowledge. The relevance of instructional design principles and their applicability to language learning will be elaborated upon in the following chapter.

6.1.5 Summary

- In image-processing, we differentiate between multimediality (processing differently coded information) and multimodality (processing information using two or more sensory modalities).
- Earlier models of the working memory described the individual components of the working memory but ignored the interaction of the components.
- These and other gaps are filled by subsequent models by Paivio (1990) and Engelkamp & Zimmer (2006).
- According to Paivio, language and images are joined together in three types of processes: representational, referential, and associative processes.
- Engelkamp & Zimmer (2006) posit a picture superiority effect through the more direct access images have to their referents in the episodic memory.
- The cognitive load theory describes different cognitive load effects that arise through interaction between learning materials and learners' cognitive structures.
- There are three types of cognitive load: intrinsic, extraneous, and germane cognitive load. Optimally, they are balanced so that the capacity of the working memory is not exceeded, an aspect also influenced by instructional design.

6.1.6 Review Questions

1. What are the greatest differences between images and language?
2. What main components does Baddeley's model of the human memory include?
3. How would you describe the primacy and the recency effect?
4. How, according to Paivio, can image and language information in the working memory be related to one another?

6.2 Reading Processes on the Text Surface

As explained in Chapter 5, text comprehension has a very distinct interactive character: creating coherence is only possible when textual knowledge and the reader's prior knowledge interact. In order to construe textual knowledge successfully, the reader must accomplish a series of processes at the text surface level, such as word decoding or syntactic analysis (cf. Kintsch 1998/Schnotz 2006). The subject of this chapter is the process of word recognition. It is the foundation for additional building processes at the textual surface as well as for the formation of a propositional text base, which in turn feeds into the formation of mental models. The development and the direct intervention of word decoding processes in the second language are therefore central topics of this chapter.

Study Goals

By the end of this chapter, you will:

- be able to describe the process of word decoding
- know and use the competences necessary for efficient word decoding
- be able to determine and explain the distinguishing factors of reading in the L1 and L2
- efficiently support and implement the word decoding ability through targeted measures in class.

6.2.1 Fundamentals of Word Decoding During Reading

As reading usually takes place at an incredibly fast pace, even we as practiced readers are barely aware of the processes necessary for decoding words. The knowledge of individual words, in particular knowledge of their standard orthographic form is, of course, an important requirement for decoding words. But how is the reader's knowledge of individual words utilized when reading? Which phases of word decoding can we distinguish? Research on the phases of word decoding has presented contrasting positions and theories: on the one side, some researchers argue that words

are decoded letter by letter (cf. Gough 1972), and on the other side, that words are decoded in the form of complete visual patterns (cf. Smith 1978). Smith's approach is based on the insights gained by psycholinguistic experiments (Reicher 1969). These same experiments verified the **word superiority effect** (Reicher 1969). According to this effect, letters are processed faster when they are presented within an existing word (cf. Klicpera/Gasteiger-Klicpera 1995: 13). Smith interprets this phenomenon as proof of words being processed as visual patterns as a whole.

Nowadays, researchers assume that the model of word decoding should take both positions into account, due to the fact that our mental lexicon stores knowledge on whole words alongside knowledge on individual letters (cf. Christmann/Groeben 1999).

In this vein, the so-called **dual route cascaded model** (Coltheart/Rastle/Perry/Langdon/Ziegler 2001, Ziegler/Ferrand/Jacobs/Rey/Grainger 2000, Ziegler/Jacobs/Klueppel 2001) postulates two different ways of word decoding in advanced readers: a lexical and the nonlexical or sublexical route.

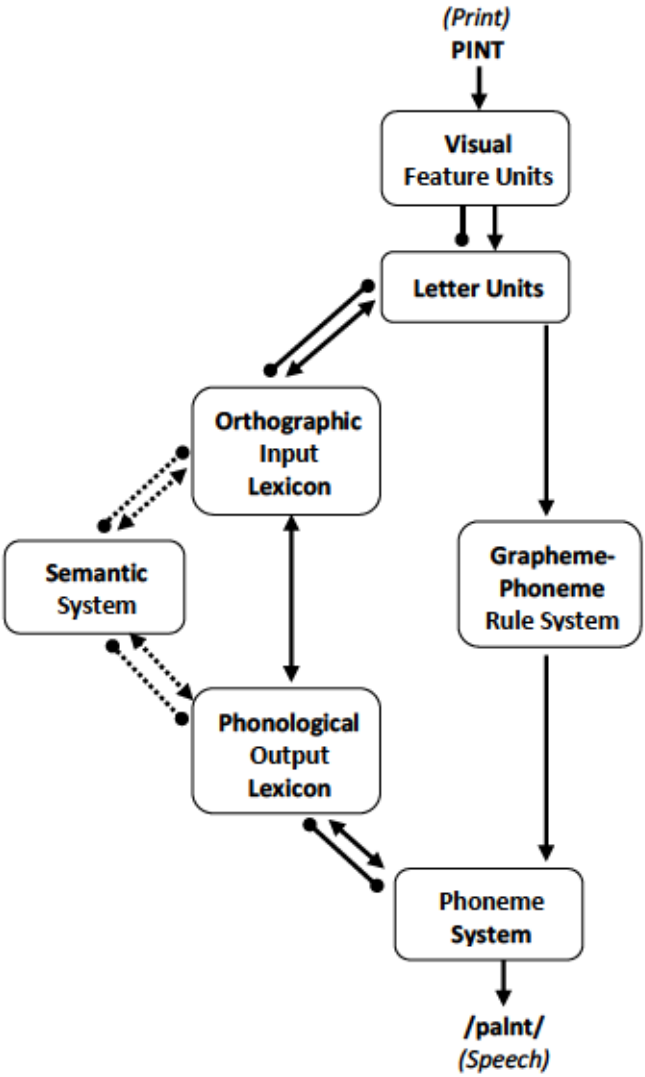


Figure 6.3: Dual route cascaded model (Coltheart et al. 2001: 213)

According to the model of Coltheart et al. (2001), the lexical path leads to the right entry of the mental lexicon by orthographically decoding the visual typeface. In other words, if a word is available in the mental lexicon,

the visual typeface directly activates the represented word. This process is also possible when a word has only been processed in a verbal form up to that point, meaning that its orthographic form as such is not yet stored in the mental lexicon. In these cases, according to Coltheart et al. (2001) there is no direct access to the word in the mental lexicon. The orthography is first processed via **grapheme-phoneme correspondences** and the word's meaning is ascertained through comparison to the stored word sound. It means that the sound form of the word is mentally reconstructed letter by letter by attributing the letters to the respective sounds, and then the combination of all decrypted sounds mentally replicate the sound structure of the word (for instance with the German word *Wal* (whale): <W> =>/v/, <A> => /a/, <L> => /l/). The model also contains a third way of reconstructing an unknown word, one leading directly from the orthographic word representation to the phonological word representation without activating the word meaning. It seems plausible for trained readers to use the lexical path, meaning that they access the word meaning directly through the typeface. How trained readers can process words as a whole without letter-by-letter **phonological recoding** is evident when correcting written assignments and repeatedly missing typos. It is also evident how we can fluently and effortlessly read a text even when the sequence of letters in a word is incorrect. When an inexperienced reader, however, encounters a compound unfamiliar to them, this may result in a slower word decoding process according to the model, even if the individual parts of the word are available as separate entries in the lexicon (cf. Andrews/Miller/Rayner 2004).

Even though the dual route cascaded model enjoys widespread acceptance, we should mention that the model does not sufficiently describe the semantic and morphological aspects of word decoding (Eysenck/Keane 2015: 366). A study by Verhoeven, Schreuder & Haarman (2006), among others, shows how important morphological knowledge is when decoding words. Elementary school children and adults took part in the study, and both groups were faster to recognize words with a real prefix (such as *uploading*) than words with a pseudo prefix (such as *upper*). Other studies have found that the productive use of morphological information (such the decomposition of words into prefix, stem and suffix) is an important indicator of individual differences while reading and determining grapheme-

morpheme correspondences (cf. Carlisle/Katz 2006; also cf. Kieffer/Lesaux 2008). This makes it often easier for inexperienced readers to decode unknown words (Perfetti 2011: 158).

Overall, these and other psycholinguistic studies indicate word decoding cannot be described, as Coltheart et al. (2001) thought, as following various distinct routes. Word decoding should instead be regarded as a network-like interaction of phonological, orthographical, morphological, and semantic information (cf. Grabe 2009; also cf. Verhoeven/Perfetti 2011, Plaut/McClelland/Seidenberg/Patterson 1996). We will see in the following section how important these factors are for promoting the ability to recode words in the context of foreign or second languages.

6.2.2 Word Decoding and Reading Acquisition in the Foreign Language

In the previous section we looked at how word decoding consists of basic sub-processes of reading and also contemplated various approaches. We saw, among other things, how the letter-reading level and the word-reading level do in fact interact and observed how morphological knowledge plays an important role in the interaction between letter and word. Consequently, we then explored how these insights can be used for promoting word decoding skills in foreign or second language contexts. Before going into further detail, we must bear in mind that teaching word decoding skills is merely a small part of the multilayered construct that constitutes reading enhancement. Apart from the purely cognitive aspects (textual surface, text base, mental models), reading enhancement can also address various reader dimensions (metacognition, motivation, identity, etc.) and aspects involving reading socialization (such as 'reading as cultural practice', among other things) (cf. Munser-Kiefer 2014: 145; also cf. Rosebrock/Nix 2008). Ultimately, it is not enough to promote word decoding abilities to help our learners become competent L2 readers. However, one cannot overlook how the ability to decode words, as a basic partial competence of reading, is fundamental for acquiring more advanced partial competences in reading (such as the formation of mental models) and is the basis for further instructional support measures (cf. Munser-Kiefer 2014: 24). We will, therefore, now look at what aspects are critical to the

acquisition of decoding skills in a foreign language. We will then familiarize ourselves with various enhancing pedagogical concepts focusing either on **phonological awareness** or on **morphological awareness**.

6.2.2.1 Influencing Factors affecting Reading in the L2

We see a great variety in L2 learners' efficiency when decoding words. In the context of Coltheart et al.'s model (2001), the phenomenon is mainly ascribed to the **orthographic distance** between the L1 and the L2 writing systems, especially when early acquisition stages are affected (cf. Koda 2005; see also orthographic depth hypothesis according to Katz/Frost 1992). According to Cheung & Cheng (2004), two descriptive parameters describe orthographic distance: orthographic representation and orthographic depth. The orthographic representation of a language may be based on an alphabetical writing system (such as in most European languages), on a syllabic one (Japanese or Arabic), or on a logographic one (Chinese). Orthographic depth refers to the extent of the grapheme-phoneme correspondence with respect to true sound. If the graphemes (letters) of a language can be reliably attributed to mainly a single sound, we speak of a shallow orthography. However, if the grapheme-phoneme correspondence displays irregularities in its attribution, then it is called deep orthography. In Spanish, for example, the grapheme <a> is always realized as the phoneme [a]. In English it is realized differently depending on the surrounding, e.g., as [ej] or [a], among others.

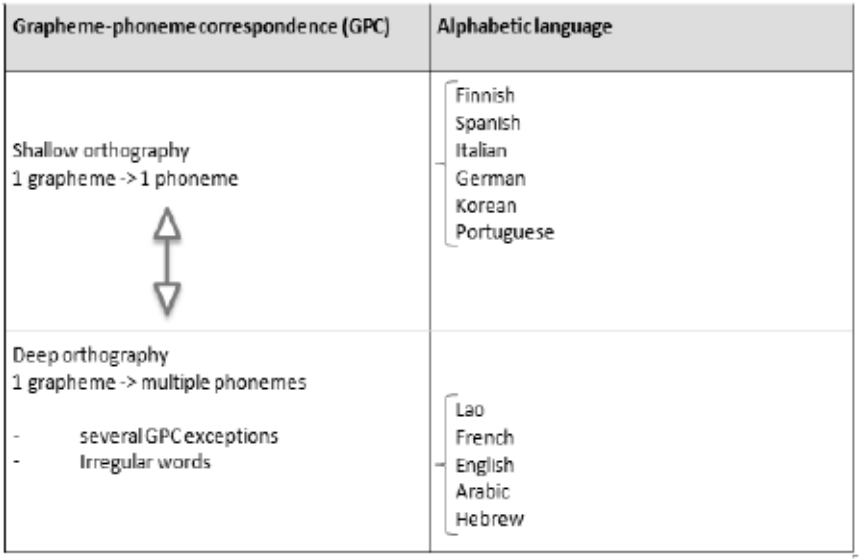


Figure 6.4: Grapheme-phoneme correspondence in various languages (based on Perfetti/Dunlap 2008: 18)

Overall, empirical findings in general seem to support the hypothesis that a similarity between orthographic representation between the L1 and the L2 has a positive effect on reading acquisition (Grabe 2009). In a naming task, Hamada & Koda (2008) discovered a marked difference between Korean (L1 alphabetic) and Chinese (L1 logographic) learners of English. They ascribed these differences to the effect of orthographic representation through the respective congruent or non-congruent L1 writing systems.

In terms of orthographic depth, we can see several interesting phenomena in the acquisition of written language. Learning grapheme-phoneme correspondences is different in every language, and so for languages with shallow orthography such as Dutch and German, phonological awareness in terms of grapheme-phoneme correspondences is not a conclusive indicator of individual differences. L2 Dutch or German readers do not find great difficulties in decoding words as the correspondences are relatively reliable and the individual variance is quite low (Grabe 2009: 117). In languages with deep orthography such as English, we can assume that the automatization process of phonological recoding via grapheme-phoneme correspondences takes a bit longer, because the orthographies possess a

higher degree of irregularity (cf. Seymour 2006). In languages with higher irregularity, learning grapheme-phoneme correspondences is often only possible by consulting the entire word form (for example *life* versus *live*). However, this also requires the learner to acquire the processing of the word in its entirety at the lexical level, in order to be able to deduce similar sound structures (rhymes, syllables, suffixes, among others) and to apply them to other words (**sight-word reading**, Grabe 2009: 118), aside from merely phonologically recoding a word. When acquiring reading skills in English, morphological awareness and the word level play important roles for this very reason (cf. Seymour 2006).

According to Wimmer & Landerl (1998), orthographic depth and the requirements associated with it can explain the fundamental differences of the various concepts of reading acquisition. For example, while in English speaking educational systems the word level and morphological awareness are often the basis for learning grapheme-phoneme correspondences, reading competences in German-speaking educational systems are taught mainly at the level of letters, usually without any reference to morphological or semantic aspects. In the following section we will explain the basics of those concepts of reading acquisition focusing on phonological awareness. While this aspect of phonological awareness has its raison d'être, it also has grave disadvantages. Unfortunately, teachers often skip these in practice, due to a misunderstood belief in structures. For this reason, morphological aspects require more attention, as they are the basis of alternative models. Such models often contain cognitive linguistic principles instead of structural formalisms and view language variation as a motor of language acquisition rather than its enemy.

6.2.2.2 Phonological Awareness

When reading in a foreign language, readers are often confronted with the prospect of decoding words they have never read before. A news anchor or sports commentator, for instance, who is unfamiliar with the word *penalty* (*'penalty*, emphasis on the first syllable), would likely pronounce it incorrectly as *pe'nalty* (emphasis on the second syllable), as commonly observed in Austrian and German sports broadcasts. According to the model of Coltheart et al. (2001) we can assume the reader utilizes a pre-lexical path. The pre-lexical path presupposes that the word is decoded letter by letter with increased effort through phonological recoding. A distinct

phonological awareness of the target language is necessary for efficient phonological recoding. The learner must possess the ability to consider the sound aspects of a language independent of the level of meaning (cf. Wemmer 2011: 4; also cf. Küspert/Schneider 2008). Factors such as the awareness and manipulation of syllables, rhymes, and phonemes are all part of the phonological awareness (cf. Wemmer 2011: 4). Only then is the learner capable of recoding a word phonologically through language-specific grapheme-phoneme correspondences.

"Stage models of writing acquisition" (e.g., Günther 1986) emphasize the importance of sound-oriented reading in the early alphabetical stage as the basis for the mastering of the orthographic stage (Schnitzler 2008: 1). This means that reading or writing acquisition initially begins by attributing sounds to letters. Only afterwards are the letters synthesized into words through grapheme-phoneme correspondences. Phonological awareness takes place at several levels (syllable level, letter level, phoneme level) and so requires a varied approach to addressing all stages. Schnitzler (2008) distinguishes between the following dimensions of depth of phonological awareness (organized by increasing level of difficulty):

- identifying (recognizing phonological units as words)
- synthesizing (joining sounds and syllables into words)
- segmenting (disassembling words into smaller phonological units)
- manipulating (substitution, addition, or omission of phonological units).

Forster & Martschinke (2001) propose additional introductory exercises for phonological awareness training, for example rhyming games with (image) cards. In these exercises, the learner needs to create a series of pairs from image cards with rhyming terms (such as the words *house* and *mouse*). The purpose of this exercise is that students direct their attention towards the form and less towards the content of the words and thereby develop a feeling for grapheme-phoneme correspondences. It is especially important in this exercise that students create connections to something familiar to them, such as the ability to distinguish between rhyming and non-rhyming words.

Approaches to the teaching of reading that are based on stage models usually isolate processing strategies and aim for a strict progression (cf. Pracht 2010). The choice of words used by such approaches depends strictly on

orthographic complexity and the difficulty level. In order to determine an adequate progression in word choices, several of the following principles should be taken into account, according to Helbig, Kirschhock, Martschinke & Kummer (2006: 199): shorter words precede longer words, long vowels precede short vowels, regular grapheme-phoneme correspondences precede irregular correspondences, long consonants (such as *f, m, n*) precede plosives, etc.

The focus on the role of formal features in the acquisition and teaching of a language, however, seems somewhat problematic from a cognitive linguistic point of view, as not enough attention is paid to the role of mental processes when forming phonological schemas (cf. Pracht 2010). For this reason, we will explore the general relevance of mental processes for reading acquisition in the next section and we will also consider how these concepts can be integrated into approaches supporting it.

6.2.2.3 Morphological Awareness

The previously presented approaches to the teaching of reading focus on phonological awareness, especially in the earlier stages. They also focus on phonological recoding using language-specific grapheme-phoneme correspondences. However, this overemphasis on the phonemic principle suggests a reductionist and, to a degree, naive understanding of phonemes as the sounds of letters: words can be reconstructed through grapheme-phoneme correspondences and independently from morphological and semantic aspects (cf. Fraser 2010: 366). However, the alphabet only indirectly describes the sound sequences of words and, therefore, is merely a medium for representing spoken language. This is apparent when we attempt to describe different variants of the grapheme <d> with grapheme-phoneme correspondences: depending on the context, this grapheme is realized as /t/ (such as in German *Hund* (spoken as [hʊnt], dog)) or as /d/ (as in German *Daumen* (spoken as [ˈdaʊmən], thumb)) (Pracht 2012: 64). These morphologically motivated spellings in particular are very difficult for foreign or second language learners (cf. Becker 2011). Excluding morphological aspects during reading acquisition can reduce the complexity of the learning materials in the early stages, but necessitates an even more complex reorganization of phonological schemas in later stages of acquisition. The reason for this is the tendency of grapheme-phoneme corre-

spondences to generate almost as many exceptions as rules. A famous satirical example of the nonuniformity of grapheme-phoneme correspondence in English is the respelling of *fish* as *ghoti*, both pronounced [fɪʃ] (with the latter referring to the sound of *gh* in *laugh*, *o* in *women*, and *ti* in *motion*). To better deal with this, it seems plausible to combine phonological awareness with morphological awareness in the early stages of reading acquisition, in order to do justice to apparent inconsistencies in spelling (cf. Pracht 2010). Several empirical studies support the combination of phonological and morphological awareness and present evidence of a close connection between morphological knowledge and the development of word decoding skills (Becker/Peschel 2013: 199; also cf. Kieffer/Lesaux 2008; **lexical quality hypothesis** according to Perfetti/Hart 2001). These studies emphasize the importance of morphological awareness for the development of phonological awareness, even in the preliteral phase:

> […] preliterate children fail even the simplest phonemic texts, such as that of identifying words which begin with the same sound […] Only after the explicit concept [SOUND OF A WORD] is mastered, can children develop, through play with rhyme, assonance and rhythm, concepts of sublexical units, such as syllables, onsets, etc. (Fraser 2010: 365)

In this context, morphological awareness is defined as follows:

> Morphological awareness refers to students' understanding of the structure of words as combinations of meaningful units, known as morphemes. It can be manifested when the reader decomposes morphologically complex words into constituent morphemes or recognizes morphological relationships between words. (Kieffer/Lesaux 2008: 784)

Another problematic aspect of approaches focused on phonological awareness is their low compatibility with the mental processes of forming phonological schemas. In parallel to the acquisition of grammar, we can assume that phonological knowledge does not emerge from learning and using *a priori* defined rules, but rather through the recognition of recurrent

patterns of concrete words and their abstractions as schematized word templates (cf. Vihman/Croft 2013).

As a consequence of this paradigm change regarding phonological knowledge, language instruction should not start on the level of letters but should begin on the word level. In the following paragraphs, we use examples from the Florida Center for Reading Research to show how morphological awareness can be integrated into the teaching of reading and vocabulary.

Experiment 1

Objective: the student will identify the meaning of words with affixes.

Activity: students make words to match meanings by combining affixes and base words.

1. Place affix (*pre-*, *un-*, *mis-*, *-ly*, *-able*, *-less*, etc.) and base word cards (e.g., *avoid, fiction, heat, direct*) face up in separate rows. Place the meaning cards (*not straight, not fiction, heat before, can avoide*, etc.) face down in a stack. Provide each student with a work board.
2. Taking turns, students select a card from the meaning stack, read it, and place it on the work board (e.g., *put together again*).
3. Find the base word (i.e., *assemble*) and affix (i.e., *re-*) to make the word that matches the meaning.
4. Place the affix and base word above the meaning on the work board and read it (i.e., *reassemble*). Return base word and affix cards back to their original positions.
5. Continue until all meaning cards are used.
6. Peer evaluation

Adapted from Florida Center for Reading Research (2007): https://www.fcrr.org/curriculum/PDF/G4-5/45VPartTwo.pdf

Experiment 2

Objective: the student will produce the meaning of words with affixes.

Activity: students make words and use them in a sentence to show meaning by playing an affix game.

1. Students place the game board (a serpentine with and affix in each space), number cube, work board, game pieces, and dictionary on a flat surface. They are provided each with a marker.
2. Taking turns, students roll the number cube and move game piece the number of spaces shown.
3. Students read the affix, identify it as a prefix or suffix, and state its meaning. They say a word with the affix and use in a sentence. For example, "Ful is a suffix that means full of. A word with the affix is helpful. I like to be helpful and do chores around the house."
4. If correct, the students leave the game piece on the space and write the word under the corresponding row on the work board. Note: students may only use a word once. They may use a dictionary, as needed.
5. If incorrect, they return the game piece back to the previous space.
6. They continue until all students reach the end.
7. Peer evaluation

Adapted from Florida Center for Reading Research (2007): https://www.fcrr.org/curriculum/PDF/G4-5/45VPartTwo.pdf

6.2.3 Summary

- Psycholinguistic studies indicate that word decoding does not follow established routes, as suggested by Coltheart et al. (2001) but is driven by a network-like interaction of phonological, orthographic, morphological, and semantic information.
- The L2-learners' efficiency in word decoding shows a great range of variation which seems to be determined by the orthographic distance between the L1 and L2 systems, which influences phonological and morphological awareness of L2.
- Concepts on reading strategies based on phases isolate the processing strategies and carefully plan their progression. Those concepts that aim at fostering morphological awareness at the same time, by contrast, combine phonological awareness and morphological awareness from the outset in order to account for the suspected inconsistencies of the writing systems.

6.2.4 Review Questions

1. How would you explain the three possible ways to decode words according to the dual route cascaded model?
2. What are the most influential factors for word decoding in the L2?
3. What are the limitations of approaches to teaching reading competences that are based on stage models?

6.3 Advanced Reading Processes

As a teacher, you often see first-hand how hard it is for learners to deduce intertwined semantic relations in their entirety when reading a longer text in a new language. Even if the learner knows the meanings of the individual words, it remains a difficult task. After all, the process of text comprehension is comprised not only of decoding and stringing words on the text surface, but also involves creating coherence at advanced levels of a text. This unit focuses on how these advanced processes work as well as on fostering reading competences by employing various reading strategies.

Study Goals

By the end of this chapter, you will be able to:

- explain higher-level reading processes
- identify the most important differences between reading in the L1 and in the L2
- promote advanced processes by teaching goal-directed reading strategies
- implement the phases of teaching reading strategies in a classroom setting.

6.3.1 The Formation of the Text Base and the Role of Prior Knowledge during Reading

According to Kintsch (1998; also cf. Kintsch 2005), several levels of abstraction in propositional text representations, that is the microstructure and the macrostructure of a text, need to be distinguished from another. The microstructure mentally represents the content of the text in the form of propositions. Propositions represent the entire volume of information of a text and, therefore, contain all the details. Retaining all the information of a text, however, proves to be very uneconomical in certain situations. While reading, readers usually turn to a series of processing strategies to reduce the text information. The reduction of text information creates an abstract propositional structure of a text: the macrostructure. According to

van Dijk & Kintsch (1983: 190; also cf. van Dijk 1980: 46), the following (macro)rules are used for creating the macrostructure of a text:

1. DELETION: propositions irrelevant to the interpretation of other propositions are omitted.
2. GENERALIZATION: a conceptually more general and less specific proposition is created from the remaining individual propositions, containing all of the semantic details of several propositions.
3. CONSTRUCTION: a new proposition, defined by a sequence of individual propositions, is constructed.

The knowledge of this type of procedure is relevant for encouraging reading because the formation of textual macrostructures enables an efficient and structured storage of text information as well as its retrieval (cf. van Dijk 1980, Louwerse/Grasser 2006). Van Dijk's (1980) macrostructure approach underlines the difference between microstructures and macrostructures and shows how two types of processing are run on the level of the text base. Both processing types can be addressed by enhanced reading instruction measures. Empirical findings show, quite unambiguously, that the execution of enhanced processes on the level of global text coherence separates the good readers from the weaker ones. With respect to the level of local coherence, Long, Oppy & Seely (1997) were able to show, by contrast, that good and weak readers process the text in a similar fashion. Encouraging advanced processing while reading in a foreign language, as a result, seems of even greater relevance: the word decoding processes on the textual surface are not as automatized in L2 readers as they are in L1 readers. Such decoding processes use up more cognitive resources on this level. As these cognitive resources are already allocated to the textual surface, they are not available for advanced comprehension processes. The lack of resources, as a consequence, is likely to result in a flawed model of the macrostructure in foreign language learners (also for instance cf. Horiba 1996, Oded/Walters 2001; see also Section 6.3.2). When learners are asked to deduce the relations between larger text units, the problems become visible. Even though the learners comprehend the individual words and sentences, they often have great difficulties recognizing and structuring larger units of meaning. We will return to the consequences of these difficulties for reading in a foreign language after we had a look at the role of prior knowledge in the generation of the propositional text base and mental models.

Texts rarely provide all of the information necessary for comprehension, so that we as readers need to draw on our prior knowledge to fill the gaps in coherence and form a mental text representation in the first place (cf. Rickheit/Strohner 2003, Rickheit/Schnotz/Strohner 1985; also cf. Ehlers 1998). The example sentence *We are going to be in the sun, you have to put sunscreen on* presupposes that the reader makes **inferences** based on information stored in their encyclopedic knowledge and creates coherent connections, recognizing the danger of the sun for the skin and the importance of protecting the skin with sunscreen to protect against skin conditions and cancer. Our use of prior knowledge to create coherence in a text is fairly obvious. More controversial is the question of what types of inferences are created automatically and what types of inferences are intentional. In this regard, Ehlers (1998; also cf. Ballstaedt/Mandl/Schnotz/Tergan 1981, Rickheit et al. 1985) differentiates between minimal, elaborative, and reductive inferences. Minimal inferences serve to create coherence on a local level, as is evident in the example sentence above on sun protection. They fill the basic gaps in coherence not addressed by the text. In contrast, reductive inferences aid the formation of the macrostructure by reducing the propositional content of the text in accordance with, among other things, the macro-rules defined by van Dijk & Kintsch (1983). Finally, "elaborative inferences" are meant to expand the propositional content of the text by consulting numerous repositories of prior knowledge and reconcile them with the reader's own experiences and expectations (Wolff 1995; quoted according to Finkbeiner 2005; also cf. Deppert 2001). Such elaborations are mainly important for the formation of mental models (cf. Johnson-Laird 1983) and their effect is, in contrast to reductive inferences, the expansion of the content.

The "standards of coherence" of the readers also play an important role: they determine which types of inference take part in the text comprehension process and the depth the processing reaches (van den Broek/Risden/Husebeye-Hartmann 1995). The standards of coherence are in turn connected to a series of factors such as the goal of the reader, their prior knowledge, the difficulty of the text, and the presence of distractors, tiredness, etc. (Linderholm/van den Broek 2002, van den Broek/Lorch/Linderholm/Gustafson 2001, Graesser et al. 1994; also cf. Linderholm/Virtue/Tzeng/van den Broek 2004). Also, the fact that prior knowledge repositories do not present static structures, but instead change dynamically de-

pending on context, seems to support the assumption that the reading situation on the one hand and the respective demands of the text on the other play important roles when making inferences (cf. Whitney/Budd/Bramucci/Crane 1995: 160). In this sense, the maximalist and the minimalist position on inferences can be reconciled with each other.

6.3.2 Advanced Reading Processes in the Foreign Language

While the L2-specific aspects of reading on the word and sentence level (textual surface) have been intensively researched, empirical findings on the propositional text base and the mental model are comparatively thin in the field of reading in a foreign language (cf. Suñer 2011: 77).

All in all, the results of the studies suggest L2 readers, especially at a lower proficiency level, use up more cognitive resources at the level of local coherence (cf. Jenkin/Prior/Rinalod/Wainwright-Sharp/Bialystok 1993, Horiba 1996, Oded/Walters 2001). For that reason, they are not capable of allocating as many cognitive resources to the determination of the macrostructure and the mental models (cf. Bensoussan 1998: 216, Nassaji 2007: 95). The reasoning behind such a conclusion is based on the compensatory encoding model by Walczyk (2000; also cf. Walczyk 1995, Walczyk/Wei/Grifith-Ross/Goubert/Cooper/Zha 2007). According to the **compensatory encoding model**, the use of compensatory strategies results from fragmented language knowledge inhibiting the processes of advanced text comprehension levels (Suñer 2011: 78). Several studies indeed showed L2 readers implementing more strategies than L1 readers in order to process linguistic stimuli on the textual surface to compensate for a lack of language knowledge (cf. Stevenson/Schoonen/Glopper 2007: 121). L1 readers on the other hand are much more likely to utilize strategies for forming mental models and strategies for expanding their textual knowledge based on prior knowledge. There are great differences between L1 and L2 reading in terms of the type of strategies utilized (cf. Stevenson et al. 2007; also cf. Fitzgerald 1995), but this is relatively constant and independent of text difficulty as well as the reader's goals (Horiba 2000: 256). To sum up, deficient mental representations of propositional text bases result in a failed activation of prior knowledge, and this significantly impedes the formation of mental models (also see Kintsch's model 1998).

6.3.3 Strategies for Promoting Advanced Reading Processes

In light of the L2-specific problems we have just described, this section intends to present reading strategies helping the reader to optimize certain aspects of advanced reading processes. Reading research differentiates between three main types of reading strategies (Christmann/Groeben 1999): repetitive strategies, organizational strategies, and elaborative strategies. While **repetitive strategies** are meant to promote processes on the textual surface (such as repeatedly reading or marking key words), the **organizational strategies** and **elaborative strategies** serve to structure the text content and expand the knowledge of the text using the reader's prior knowledge (cf. Munser-Kiefer 2014: 136). These last two strategies are the ones relevant to promoting advanced processes.

6.3.3.1 Organizational and Elaborative Strategies

Organizational strategies provide numerous possibilities for promoting macrostructure construction through specific supportive measures, such as developing text-accompanying graphic overviews. **Superstructures** (cf. van Dijk/Kintsch 1983) can serve as a basis for the representation of graphic overviews. Superstructures are described as conventionalized, often recurring schematic forms of globally organized text models. These encompass everything from text type-specific structures of a text to the more general conceptualized organization forms of texts (cf. Louwerse/Graesser 2006, Jiang/Grabe 2007), such as classifications, argumentation patterns, processes, chronological sequences, definitions (with the structure "x is a x that x"), comparisons or contrasts, cause-effects, pro and contra arguments (cf. figures 6.5–6.7).

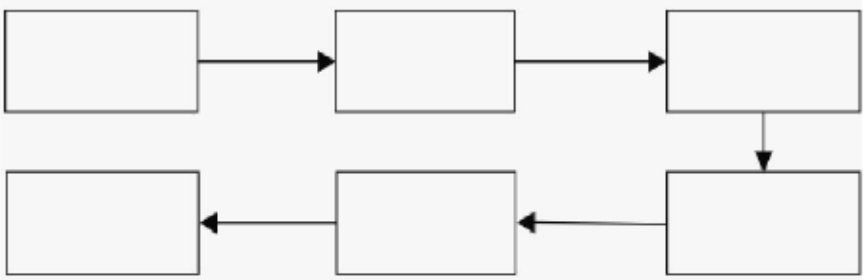


Figure 6.5: Argumentation (Jiang/Grabe 2007: 45)

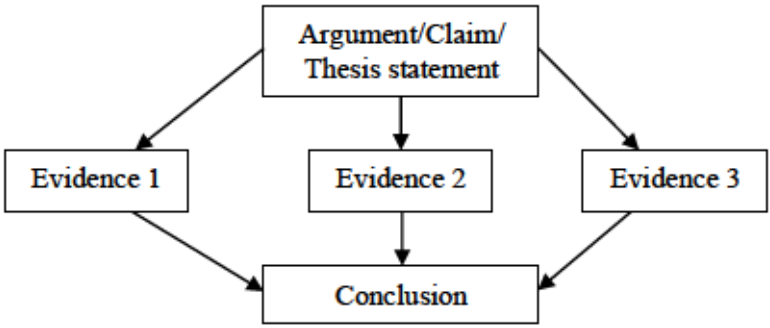


Figure 6.6: Chronological sequence or process (Jiang/Grabe 2007: 44)

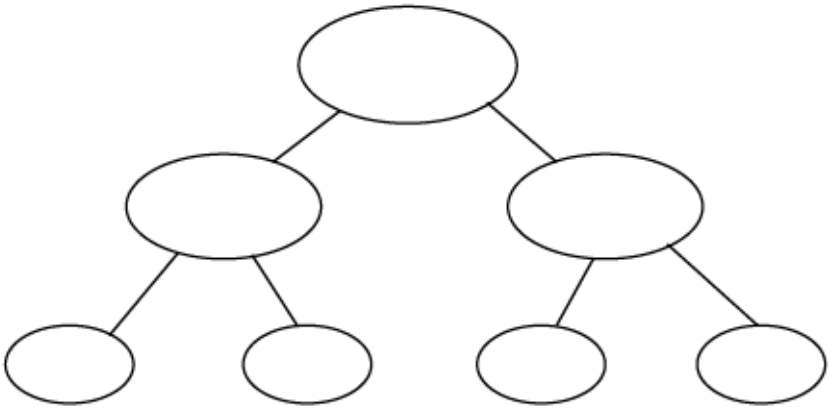


Figure 6.7: Classification (Jiang/Grabe 2007: 45)

The use of one of these superstructures can make it easier to classify and group the text content on a global scale (cf. Louwerse/Graesser 2006). Apart from extracting the superstructure of the text content, there are several other organizational strategies the reader can use to comprehend the content of a text and to restructure or reduce the text for further use, depending on the circumstances. Examples of these types of organizational strategies are: finding concrete information within the text, identifying a text's key ideas, creating references between the parts, and so on (cf. Christmann/Groeben 1999).

In contrast to organizational strategies, elaborative strategies transcend a text's content and expand it using the reader's existent knowledge repositories, so they can use acquired knowledge to realize individual goals (cf.

Christmann/Groeben 1999). Elaborative strategies are connected to the processes of mental model formation of texts as they encourage important advanced reading processes (as defined by the PISA study 2000). Reading competence means to be able to read, use and reflect on written texts in order to attain one's own goal to develop one's own knowledge and potential, and to take part in social life (cf. PISA 2001: 80). According to the PISA study, the reading process not only consists of determining text content and the global structures within a text, but rather of processing text knowledge in accordance with one's own judgement and utilizing it in different situations. Accordingly, Christmann & Groeben (1999) refer to the following (reading) strategies as elaborative strategies, among others:

- forming analogies, searching for examples and finding explanations
- working out advantages and disadvantages, finding counter arguments
- formulating hypotheses
- working out the author's intentions and goals
- making comparisons between pieces of information from different sources, evaluating what has been read
- determining personal relevance.

Hence, the superordinate goal of elaborative strategies is to make it easier for the reader to create a connection between newly acquired knowledge from the text and already existing knowledge structures, as well as personal experiences (cf. Munser-Kiefer 2014: 137). In this sense, the examples in the exercises in Chapter 6.2 for promoting hypothesis formation when reading texts should be regarded as targeting elaborative strategies since the prior knowledge of the reader is integrated in the reading process. Furthermore, several studies of reading strategies emphasize the necessity of promoting **metacognitive knowledge** as well as teaching organizational and elaborative strategies (cf. Sohrabi 2012, Munser-Kiefer 2014). Knowledge and the control of a person's own cognitive processes is part of an individual's metacognitive knowledge. The reader, according to Christmann & Groeben (1999) must acquire reading strategies along with a sense of how and when to use them. Additionally, the reader should monitor their own reading process and if necessary be able to evaluate the success of the reading strategies used (cf. Christmann/Groeben 1999). For this

reason, the reader is well advised to define a reading goal before choosing an adequate reading strategy. Depending on their decision, they can then make appropriate adjustments. The use of strategies should also always be attuned to the reading goals so that no particular deep reading or detailed processing of the text structure is necessary for finding certain text information. We will discuss metacognitive strategies extensively in the following chapter.

6.3.3.2 The Use of Visualization as a Reading Strategy

We have already shown in what ways the advanced processes on the levels of text base and mental models described are important components of the reading process, even if they require different strategic procedures. For this reason, we want to show in this chapter how reading strategies are developed and taught in the classroom, using the example of text-accompanying graphic overviews.

Graphic overviews often consist of spatially allocated image-based information and linguistic information, whose concepts (also referred to as nodes) are connected with each other through semantic relations (usually lines) and appropriate labelling (Mayer 2001; also cf. Keller/Grimm 2005: 169). The value of a graphic overview lies precisely in the spatial representation of linguistic information as this type of representation makes the relations between concepts or propositions explicit (Tergan 2005, Gyselinck/Jamet/Dubois 2008: 356). Graphic overviews can also help visualize complex concept structures, which otherwise could only be represented in our minds with great cognitive effort (cf. Ware 2005: 29, Rouet/Potelle 2005: 303). The advantage for foreign language learners is the information processing that partially takes place through image processing. In this way, an extraneous overload is avoided (cf. Chapter 7). In other words, learning from texts can be distinctly enriched by the inclusion of image-based features (cf. Mayer 2005a). Loosely, based on Sumfleth, Neuroth & Leutner (2010: 67), the following distinctive steps lead to the creation of a graphic overview:

- Note important terms (perhaps after formulating an opening question).
- Determine the type of spatial arrangement (hierarchical, sequential, network-like, etc).

- Space the terms on paper in accordance with the chosen arrangement.
- Connect terms with arrows.
- Label arrows (optional).

With respect to the second step, several studies have found that the previously explained superstructures more likely result in greater learning success when creating a graphic overview, instead of network-like representations, especially in learners with a rather meager degree of prior knowledge on the subject matter of the text (see for example Amadieu, Tricot/Mariné 2009, Möller/Müller-Kalthoff 2000, Potelle/Rouet 2003). Learners who possess a higher degree of prior knowledge are able to learn better with more complicated conceptional graphic overviews, such as non-hierarchical or network-like overviews. The following images show two types of graphic overviews:

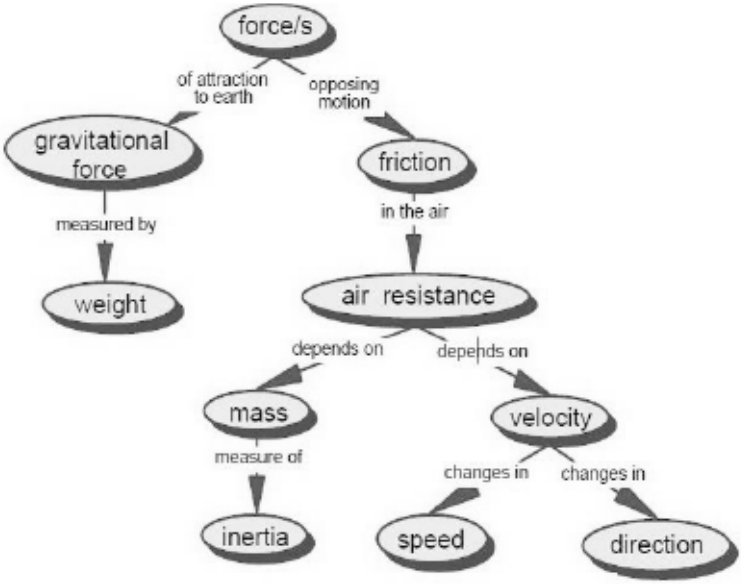


Figure 6.8: Hierarchical graphic overview according to the criterion of classification (Puntambekar/Stylianou/Hübscher 2003: 42)

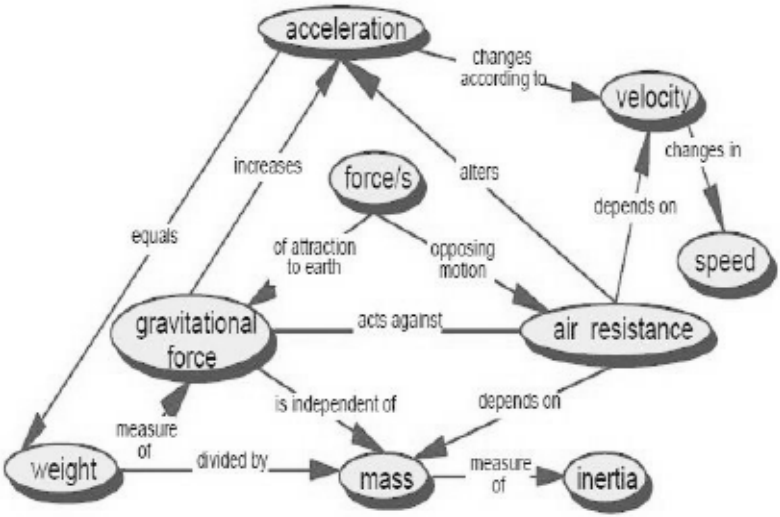


Figure 6.9: Network-like graphic overview without a discernible centre (Puntambekar et al. 2003: 42)

Depending on the content of the text, two or more superstructures are often used in combination when creating a graphic overview (Jiang/Grabe 2007: 44). Graphic overviews also offer additional design options with the use of colors, as these may be used for highlighting common features among the concepts depicted by the graphic overview (cf. Folker/Ritter/Sichelschmidt 2005). In order to attain the desired learning success, it is recommended to always couple color coding with the concrete requirements of the task. Otherwise, this supposed aid might turn out to be irrelevant or in some cases may even result in learning-inhibitory effects (Keller/Grimm 2005).

The goal of such a strategy is for the learner to be able to work with graphic overviews receptively and productively. Teaching this type of learning strategy to learners for productive application involves the following three phases: in the first phase, the learners look at different prefabricated graphic overviews within the bounds of their reading material and become familiar with the components and the structure of graphic overviews. The teacher also explains how graphic overviews are created (cf. Sumfleth et al. 2010). In a second phase, the learners can be presented with text-ac-

companying graphic overviews containing gaps for the learners to fill. Finally, learners can attempt to create graphic overviews independently as described in the guidelines in the first phase and discuss their results in groups.

Advice: There are numerous programs for creating graphic overviews on the internet (for example, see cmap.ihmc.us). The free software Cmaps Tools© of the Institute for Human and Machine Cognition (IHMC) has proven itself to be an efficient tool for various reasons: for example, its quick and easy installation, its easy use, and its broad range of settings for exporting files.

Experiment

Try out Cmaps Tools© by creating a graphic overview of the different reading strategies. You may want to add some resources and examples for illustration purposes.

6.3.4 Summary

- The formation of macro structures has the purpose of efficiently reducing text information and is implemented using the macro-rules of deletion, generalization, and construction.
- Greater difficulties at the level of the textual surface often lead to deficiencies in determining a text's macro structure.
- Organizational strategies, on the one hand, serve to structure text content, elaborative strategies, on the other hand, exceed the text content and expand it using the reader's prior knowledge.
- The knowledge, as well as the control of one's own cognitive processes are considered a part of metacognitive knowledge.
- Graphic overviews consist of spatially arranged image-based and linguistic information.
- Graphic overviews offer great advantages for the enhancement of L2 reading.

6.3.5 Review Questions

1. For what purpose do we use macro-rules when reading?
2. Which organizational and elaborative strategies do you know? Name three examples.
3. How can teachers explain how to independently create graphic overviews for the improved illustration of a text's macrostructure?
4. What are the advantages of using graphic overviews as text-accompanying learning aids for language learners?

6.4 The Role of Learning Strategies for Information Processing

Parvaneh Sohrabi

The preceding chapter dealt with reading competence and the enhancement of learning strategies. This chapter revolves around the question of task control, especially in terms of situations involving multitasking. In multitasking situations, many ancillary processes (e.g., going through the shopping list in one's mind, conversing with one's partner in the front passenger seat etc.) take place simultaneously to the main process (such as driving a car). We usually master these multitasking situations without any effort and without ending up in an undesirable situation, such as a car accident. This form of task control is called **executive control** or **regulation**. Executive control is not only very important for mastering everyday situations, but also for the learning process, in particular for knowledge processing. In relation to the learning process, executive control or regulatory activities are referred to as **metacognitive strategies**. In the following chapter, we discuss the value and application of metacognitive strategies when accomplishing tasks, especially when analyzing texts.

Study Goals

By the end of this chapter, you will be able to:

- evaluate your own reading behavior and your use of metacognitive strategies
- use language processing models and your knowledge of metacognition to explain the function and use of metacognitive strategies
- apply these strategies to your teaching, e.g., when reading difficulties occur in a learning and task-based teaching unit
- evaluate existing enhancement measures.

6.4.1 Cognitive Abilities and Learning Abilities as Conditional Components for Successful Learning

Let us return to the earlier example of *driving* as a simultaneous process. It is an everyday situation and probably seems effortless to you, as you probably barely remember the challenge of sitting behind a steering wheel for the first time after receiving your provisional driver's licence. You had to handle the situation somehow. An experienced driver is usually able to master multitasking in such a situation with self-direction and confidence. They automatically initiate solution paths for mastering tasks. If later asked about the individual steps the driver has completed in order to arrive from Point A to Point B, they would probably not be able to remember or verbalize all of the steps. The important thing is that they are able to access enough memories of various skills from the **skill memory** (also known as procedural memory) for this kind of everyday situation. The skill memory stores all memories relating to the execution of a skill or an action. Current research distinguishes between two basic forms of skill memory: sensorimotor skills and cognitive skills.

Sensorimotor skills include motor skills such as opening and closing doors, driving a car, dancing and drinking from a glass. On the other hand, we draw on **cognitive skills** when solving problems and tasks or when implementing strategies (cf. Gluck/Mercado/Myers 2010: 133). The ability to speak, write, read, or to implement learning strategies accurately are all acquired cognitive skills. The common denominator of cognitive skills is their basic ability to improve over time with practice (cf. Gluck et al. 2010: 132). Especially because cognitive skills are something we acquire, they play an important role in the human socialization process. Without our cognitive skills, we as humans would not be able to employ autonomy or agency as our key qualifications. We have already dealt with the mastery of tasks in everyday situations: inside the learning process, cognitive skills, in particular learning strategies and self-regulatory skills, are crucial components, which we will take a closer look at now.

Numerous definitions exist for the term **learning strategy**. For instance, Hasselhorn (1992: 36) defines learning strategies in the context of task-based terms and describes learning strategies as potentially conscious and controllable goal-oriented processes. Allen (2003: 231) treats the term learning strategy as "a step or action that is designed to enhance learning, that is not automatic, and that is deliberately chosen by the learner and

applied to a learning task". In the publications of Oxford (2003: 274) a learning strategy is "a plan that is consciously aimed at meeting a goal. […] conscious control, intention, and goal directness remain essential criteria for a strategy". A comparison of the various definitions we have just listed shows how, despite all differences, the common denominator of learning strategies is that they are target-oriented, conscious and controllable actions or processes. Aside from numerous attempts to define the term learning strategy, we also encounter different attempts to provide more concrete classifications. The most typical classification paradigm referring to learning strategies involves seven categories: cognitive strategies, metacognitive strategies, mnemonic or memory supporting strategies, compensatory strategies, affective strategies, social strategies, and self-motivating strategies (cf. Anderson 2005: 760). While the first six also appear in Oxford's work (1990), Chamot & O'Malley (1994), among other researchers, prefer to subdivide them into cognitive, metacognitive, affective, and social strategies. The works of Dörnyei (2001) centre around self-motivating strategies. We discuss cognitive and metacognitive strategies at a later point in greater detail. For the sake of being thorough, we would also like to mention learning techniques such as the creation of notes and memos, as these techniques contribute to the execution of mnemonic or memory-supporting strategies. Affective strategies are used for regulating emotions and motivations. Social strategies include activities the learner uses for the interaction with other learners (cf. Cohen 1999: 8, O'Malley/Chamot 1990: 8). Socio-affective learning techniques include collaboration, questions, and self-talk (cf. O'Malley/Chamot 1990: 45). Self-motivating strategies involve learning techniques such as defining and redefining learning goals as well as frustration management. Learning strategies are overarching processes or actions. Learning techniques on the other hand are individual measures or partial actions of these processes (cf. Fredericksson 2019: 313–322 for a comprehensive overview). This means that **learning techniques** are embedded in learning strategies and only surface in the context of a certain task within a certain learning strategy.

6.4.2 Cognitive versus Metacognitive Strategies

Imagine you receive a text which you must analyse by yourself in order to present a summary of it at a later point. The strategies you would usually

implement are summarization, organization, and image-based presentation. The learning techniques, applied as partial actions, would be highlighting, underlining of important passages with a marker, and transferring the key words to a diagram illustrating the relations of the individual pieces of text content. The above mentioned strategies are referred to as cognitive strategies. **Cognitive strategies** serve the purpose of the direct intake and processing of information (Wild, Schiefele/Winter 1992: 3), and, therefore, encompass learning techniques with the intention to absorb, identify, classify, memorize, elaborate, and critically verify as well as store information (cf. Cohen 1999: 7, O'Malley/Chamot 1990: 8). Friedrich (1995) considers the following strategies to be cognitive strategies:

- memorization and revision strategies
- elaborative strategies
- transformative strategies
- reductive organizational strategies.

Strzebkowski (2006: 72), however, distinguishes between the following learning techniques in terms of the aforementioned strategies:

- memorization and revision strategies:
    - memorizing and storing individual pieces of content in the long-term memory
    - actively revising and reciting
    - using a Vocabulary-Index-Machine.
- elaborative strategies:
    - augmenting new content with additional information, semantic analysis and adaptating it for a better and broader integration of the information into existing cognitive structures
    - activating prior knowledge
    - creating connections to prior knowledge
    - creating meaningful internal connections (to develop internal structures) within the new material (construction)
    - using analogies and examples
    - paraphrasing

- working with cognitive maps and concept map representations
- analysing connections
- developing overarching connections between partial aspects of the content
- formulating and answering questions
- critiquing
- drawing conclusions
- applying what has been newly learned to other content (transfer).

- transformative strategies:
  - transferring information to a different form of presentation, usually coupled with reductive organizational strategies
  - using mindmaps, generating semantic networks ('networking'), using diagrams, visualizations, images and posters.
- reductive organizational strategies:
  - reducing the complexity of information and categorizing it in larger units for increased clarity, comprehensibility and analysis
  - reducing the information to individual terms (keywording) and concepts
  - semantic classification – creating classifications for terms, concept, and subdivisions
  - creating lists of terms
  - reducing semantic structures (associative, hierarchical, causal)
  - summarization (in text form, with the aid of graphic techniques such as networking, mapping or creating diagrams as a form of transformational strategies)
  - creating notes and transcripts as well as other aids
  - organizing, classifying, and labelling learning materials.

However, the aid of cognitive strategies can only partly ensure problem-solving. A complete resolution of a problem also requires the control over processes of these strategies (cf. Boekaerts 1997, Friedrich/Mandl 1992, Simons 1992). Think of experienced chess players who plan their moves fives steps in advance. They not only require highly organized knowledge repositories, but also need to plan, execute, monitor, and evaluate the moves and, if necessary, modify the strategy. The terms self-regulation, self-monitoring, and self-guidance target the monitoring and regulative aspects of autonomous learning and are realized with the aid of **metacognitive strategies**. In comparison to cognitive strategies, metacognitive strategies are aimed less towards the actual learning process, as cognitive strategies are, but rather target the control of cognitive processes and the indvidual's learning progress (cf. Hasselhorn 1992: 37). They consist of two aspects: the static declarative aspect of knowledge and the dynamic aspect of executive control. We will discuss the latter in more depth in this chapter. The developmental psychologists John Flavell (1971) and Ann Brown (1978) were among the first to reflect on the components of metacognition. Flavell focused on the declarative aspect of knowledge, while Brown mainly contemplated the executive aspect of control. Kluwe (1981, 1982) first differentiated between the declarative aspect of knowledge and the executive aspect of control.

The declarative aspect of the knowledge of metacognition, also referred to as metamemory, mainly consists of a knowledge of learning and memorization strategies, which are located in the episodic memory (memories of events) and in the semantic memory (memories of facts). For this reason, Flavell (1984) speaks of metamemory. Together with Wellman, Flavell expanded the term with the following four subcategorical fields of knowledge (see Figure 6.10): knowledge of the individual variable enables the learner to realistically evaluate his or her knowledge, knowledge of the task variable encompasses the knowledge of the factors facilitating or impeding learning requirements, knowledge of the strategy variable is the knowledge of general and special learning and memorization strategies. However, a task can only be correctly evaluated for the right strategy with the help of metacognitive sensitivity. (cf. Flavell 1984: 24). Accordingly, this part of the knowledge aspect serves a key function: it triggers strategic action based on the learner's available knowledge (cf. Hasselhorn 1992: 37).

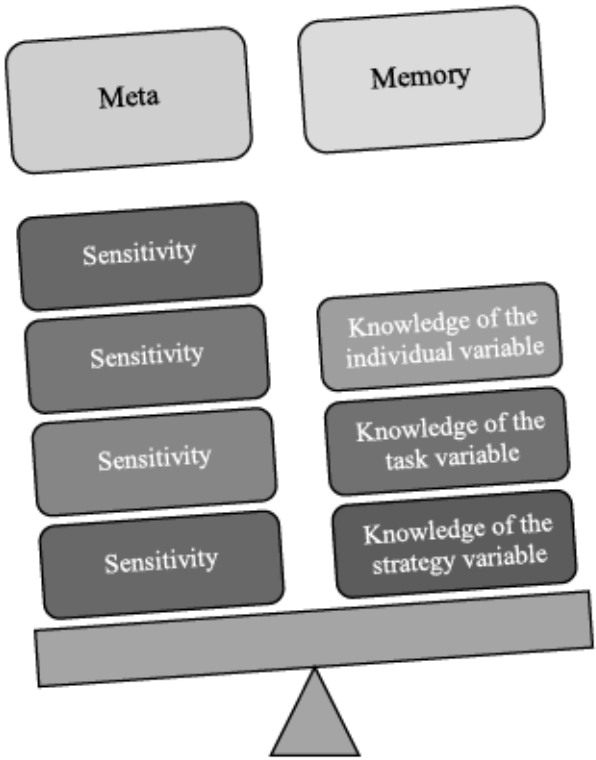


Figure 6.10: Components of metamemory

In order to understand the interplay between the components of metacognition, let us look at an example situation taking place in a train station. Imagine a seven-year old child was asked to pick up their grandmother from the train station. Due to the difficulty level, the child would likely be overwhelmed by the task. The resulting reaction could be very different and ideally, the child would ask a familiar adult for help. An adult would have enough memories of events and facts stored in their brain to feel up to the task (sensitivity). However, this knowledge alone would not be sufficient to master the task. The child would have to call upon certain cognitive skills from their skill memory to be able to master the set task, such as the ability to suppress or manipulate certain (mis)information (such as the noise in the train station) in order to reach the actual goal (attaining the correct information regarding time and place of arrival). The cognitive

skills the child or adult would retrieve from the skills memory in this situation are referred to as the executive controlling aspect of metacognition in literature. The term executive control relates to the question of 'how' the learner's declarative strategy knowledge is implemented or used. Ann Brown divides the executive control up into planning activities, monitoring activities, and result-related activities. The planning activities take place before tackling the task itself (cf. Brown 1984: 63). In this first phase the learner evaluates the task requirements and the necessary resources before formulating learning goals and learning questions, activating prior knowledge, and choosing appropriate strategies (cf. Bannert 2007: 26). The monitoring activities take place during learning: managing, verifying, changing, and replanning the initial strategies are all part of monitoring activities (cf. Brown 1984: 63). The monitoring process focuses attention on learning and goal achievement. The implemented strategies are also monitored in terms of their adequacy, and difficulties are eliminated. If the subject areas happen to remain vague, the learning processes are repeated (cf. Bannert 2007: 26). The resulting monitoring activities verify the results of the applied strategy in accordance with criteria of efficiency and effectivity (cf. Brown 1984: 63). These two criteria require a diagnosis and evaluation of the attained learning progress as well as the evaluation of the appropriateness of the used strategy (cf. Bannert 2007: 26). The executive control aspect of metacognition is composed of learning techniques related to pre-assessment, pre-planning, online-planning, evaluation, and post-evaluation of the learning processes (cf. Cohen 1999: 7, O'Malley/Chamot 1990: 8). How should we envision the whole process working, exactly? Imagine you have been handed a text on the subject of mobile phone radiation and are supposed to work through it. How would you proceed? Which metacognitive techniques would you employ? Would you start reading immediately? Hardly! Before actually reading the text, you would ask yourself, 'What is the subject of this text?' You would make a pre-assessment. The next likely question would be, 'Why am I reading the text? Am I reading the text to receive an overview or in order to find specific information?' You are planning or rather defining your reading goal. Only then would you begin with actually reading the text, while constantly keeping your reading goal in mind. You would likely monitor your activities by asking yourself, 'How does the content relate to the reading goal?' You would mark everything pertaining to this reading goal. You would dismiss every-

thing else. When you have completely read the text, you would ask yourself, 'What have I comprehended? Have I understood everything or not? What haven't I comprehended, and why?' The following Figure 6.11 illustrates the steps we have discussed just now.

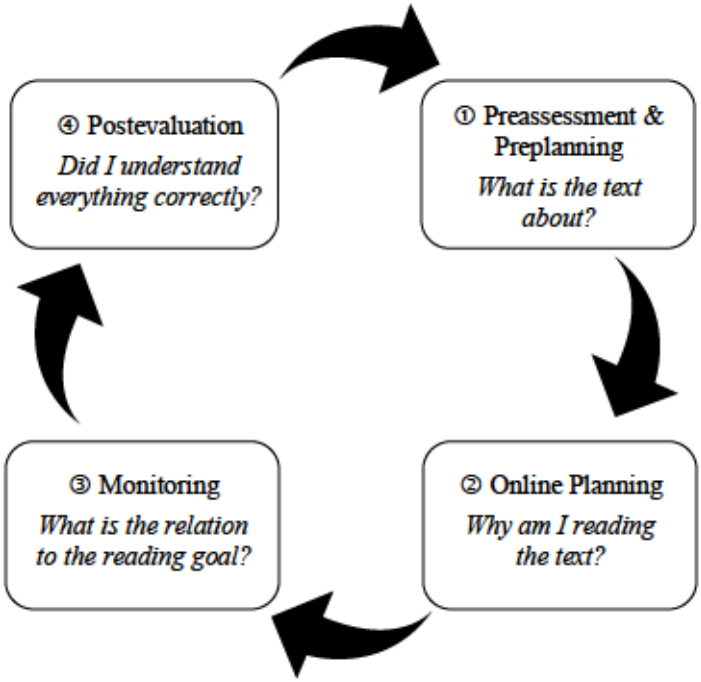


Figure 6.11: Executive control aspect of metacognition – case study reading

Of course, there are several alternative attempts to classify metacognitive strategies aside from the classification schemes by Flavell and Brown, such as the one by Hasselhorn (1992: 42). Hasselhorn distinguishes between five subcategories of metacognition: systematic knowledge, epistemic knowledge, executive processes (management), sensitivity for the potential of cognitive activities, and metacognitive experiences with respect to one's own cognitive activity. How might we imagine the interplay of metacognitive and cognitive strategies as well as learning techniques? The relationship between cognitive strategies, metacognitive strategies, and learning techniques is similar to a hierarchy in a company (see Figure

6.12). Metacognitive strategies have a similar function as a director or general manager at a large company who is responsible for a team or division. The manager leads, organizes, coordinates, and monitors the work. The smallest common denominator of all managing positions are four primary tasks: planning, organizing, leading, and controlling. All of these four primary tasks serve to promote and reach the company's goals. Cognitive strategies function like a senior or executive employee in a company's division. Within these divisions, they in turn delegate the tasks set by the manager. The learning techniques can be likened to the employees who are responsible for a certain task.

Figure 6.12: Interplay of metacognitive and cognitive strategies as well as learning techniques

As you can see, the metacognitive strategies (manager function) possess a special role in terms of task management. In fact,

> there is much evidence that they are responsible for the executive management and control of many cognitive functions, among them (1) the guided actualization of short-term storages, (2) setting targets and planning, (3) guiding attention when switching from one task to the next (task-switching), as well as (4) choosing stimulus and suppressing reactions. (Translated from Gluck et al. 2010: 181)

The following model by Borkowski attempts to show how information can be processed efficiently (Figure 6.13).

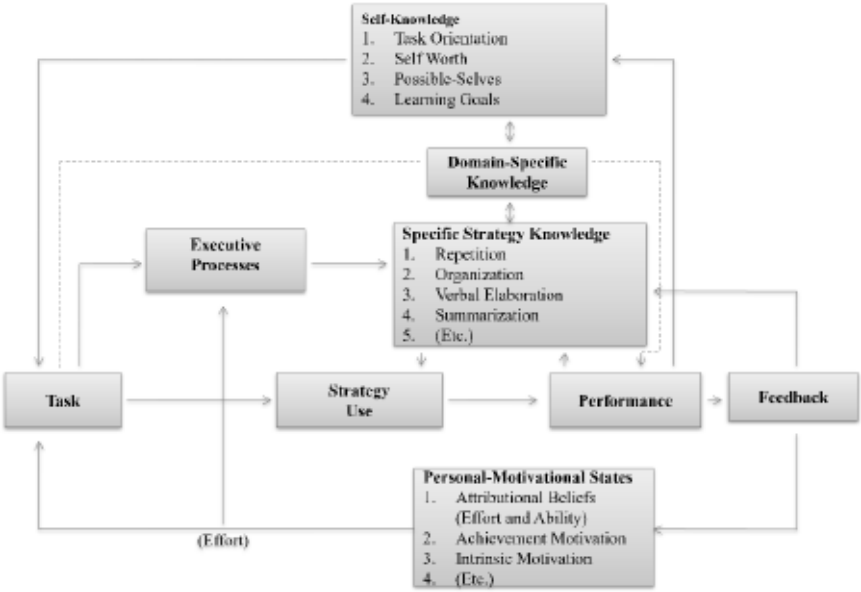


Figure 6.13: Cognitive, motivational, and self-system components of metacognition (Borkowski 1996: 399)

The model of information processing functions according to an input (task/reading) and output principle (feedback). The processing or non-processing of a task is controlled by the self knowledge and one's abilities. If a learner should find that they are not up to a task, additional processes are not even activated in the first place and the task is not processed. Otherwise, executive processes are initiated, i.e., planning strategies. The learner calls upon appropriate strategies from an inventory (specific strategy knowledge) and a strategy is implemented, which in turn entails a certain performance (reading comprehension). According to how successful the strategy works, feedback is generated. The feedback reports back to the specific strategy knowledge whether or not the accessed strategies were appropriate, and, on the other hand, encourages or discourages motivation (the personal motivational states) (cf. Sohrabi 2012: 42). How well you master a task depends on the frequency and intensity of your previous experiences as well as on the feedback you have received.

Experiment 1

Let's go back in history: have you ever heard of the "method of loci" used by the ancient Greeks? It helps a speaker to memorize several items by associating topics to specific locations. Let's give it a try:

1. In the previous chapter you encountered a number of strategies. Write down the 10 most important ones. Imagine that you will be giving a public talk on those strategies in a few minutes.
2. Now choose a well-known place/room in your home or school and associate each corner and other prominent feature of that room with one of the strategies. The location of the items should reflect the order in which you want to talk about those items.
3. Take a mental walk along your route and memorize the items. Repeat your 'walk' until you are sure that you know all the items by heart.
4. Do a dry run, and if you find an audience, give your public talk.

How helpful do you find this memorization method in general and in particular for memorizing learning languages, your shopping list, or any other important matters for life?

6.4.3 The Necessity of Promoting Learning Strategies

We mentioned earlier in this chapter why learning strategies play an important role in learning practice. Research literature often considers learning strategies a prerequisite for effective independent learning (cf. Schiefele/Pekrun 1996, Weinert 1996). It also assumes that the quality of the learning performance is influenced decisively by the use of learning strategies (Artelt 2000), this has even been demonstrated in studies. Davis & Linn (2000) were able to show that metacognitive prompts result in a greater learning effect. Veenman (1993), as well as Simons & De Jong (1992), were able to prove significant learning effects, though only in versed learners who had achieved a certain degree of automatism. In the studies by Lin & Lehmann (1999), as well as those by Stark & Krause (2009), the learning successes only occurred during difficult tasks, transfer tasks, or even inferential questions. Plötzner & Härder (2001) were also able to prove that encouraging the learner to determine coherence (metacognitive prompts) results in an improved learning performance. Bannert

(2003, 2005 and 2006) provides similar findings, wherein the experimental group exhibited learning behavior involving metacognitive strategies and improved performance specifically in the area of applied knowledge.

Apart from these findings, we live in an age in which "lifelong learning and learning ability present a central extra-functional qualification in all areas of professional life" (translated from Tönshoff 2007: 332). This general reasoning alone justifies discussing learning strategies in the classroom. Cognitive skills, learning strategies among them, are a basic form of skill memory. This supports the argument for encouraging these skills. As with all skills, cognitive ability can be acquired. How else would we explain the way humans as learning individuals pass through the following learning phases?

- In the cognitive learning phase, the learner must still plan all actions.
- In the associative phase, the learner is able to handle a number of strategies, but there is room for improvement.
- In the automatized phase, the learner is already an expert and capable of implementing strategies without a second thought.
- As an experienced master, the learner is able to rely on their memories and skills (cf. Gluck 2010: 132).

The young child at the train station from our previous example situation would still be in the cognitive learning phase. The adult, on the other hand, would be considered an expert or even a master in coping with the stressful situation at the train station.

Because executive management and control are key functions, they have been conceptualized and tested in numerous programs since the establishment of the metacognitive concept in the 1970s. Some were able to reach outstanding evaluation results (Sohrabi 2012: 86). A substantial goal of metacognitive enhancement is, according to Brown, Campione & Day (1981: 14), for the learner to develop specific learning competences via systematic instructional measures and significantly improving learning performance. Not only mid-range and localized effects, but also long-term and general cross-sectional learning improvements are meant to be achieved (Hasselhorn 1992: 53).

There are direct, indirect, and mixed training measures. Direct training measures mainly provide a general overview, explain strategic learning activities in detail, and provide necessary consolidation using guided exercises. Indirect measures are more like learning prompts. They prompt the learner at certain times to carry out certain cognitive and metacognitive activities while learning. If they appear in mixed form, they are referred to as mixed training measures (cf. Bannert 2007: 235).

The goal of direct support measures is to thoroughly introduce the learner to the use of learning strategies. How could these measures succeed? Various models which are focused on strategy instruction have been conceptualized over the past 40 years, summarily referred to under the term **strategy-based instruction models** (SBI models). The models conceived by O'Malley & Chamot (1990), Oxford (1990), Grenfell & Harris (1999), Chamot (2005) as well as Chamot, Barnhardt, El-Dinary & Robbins (1999) are so-called representative models. Apart from a few discrepancies, all of these models have four steps in common (cf. Rubin/Chamot/Harris/Anderson 2007: 142): 1) raising awareness, 2) presentation and modeling of strategies, 3) multiple practice opportunities and self-evaluation of strategies' effectiveness, and 4) transfer of strategies to fresh tasks.

The first sensibility enhancing phase (raising awareness) entails focusing the learner's attention on already implemented strategies. Sensitization can take place with the aid of standardized questionnaires, group work, questions beginning with who, what, where, why, how and so on, learner journals or reading specialist literature on the subject of strategies. Why is the sensibility enhancing phase important? The problem it addresses is that many of the skills we take for granted are, in fact, hard to identify explicitly: "in contrast to the episodic and semantic memory, the content of skill memory [including learning strategy] cannot always be verbalised" (translated from Gluck et al. 2010: 132). This is the reason why even proficient readers do not remember all of the steps they undertook in order to understand a text. Imagine you have been handed a newspaper article and are expected to garner a first impression within a few minutes. How would you proceed? Among other things, you have to first skim the text in order to receive a first impression via the most informative words and text passages. In order to create a coherent picture of the subject, you would probably use organizational techniques such as taking notes and making mind-maps. To evaluate reading strategies, you would perhaps consult the evaluative grid by Mokhtari & Reichard (2002), the metacognitive awareness of reading

strategies inventory (MARSI). It has been tested with 443 subjects and has a high reliability of .89. You can learn more about the advantages and disadvantages of sensibility enhancing measures in Rubin, Chamot, Harris, & Anderson (2007: 152). Online instruments exist alongside the offline instruments we have listed above and include protocols of loud thinking (LD protocols), logfile analyses and eye tracking devices.

The presentation phase (presentation) initially models strategy use and introduces new strategy uses. In the subsequent practice phase (practice) the learners are offered the opportunity of practicing new strategies. In the self-evaluation and assessment phase (self-evaluation & assessment) the newly learned and used strategies are then checked for target relevance and adequacy. The concepts of direct (meta)cognitive reading enhancement include, according to Allen (2003: 326), the reciprocal teaching approach (RTA) by Palinscar & Brown (1984), transactional strategy instruction (TSI) by Pressley & Wharton-McDonald (1997), and cognitive academic language learning approach (CALLA) by Chamot & O'Malley (1994). The first two of these strategies are conceptualized for reading in the L1 and the cognitive academic language learning approach (CALLA) for reading in a foreign language.

As we have stated previously, indirect measures should be considered as learning prompts which aid the learner at certain times to carry out certain cognitive and metacognitive activities while learning. Student-centred supportive learning aids and guides (**scaffolds**) and, of these, especially process prompts are indirect measures which are provided by the teacher during the learning process (Bannert 2007: 235). Instructional scaffolding is meant to initiate and encourage specific learning and regulatory activities. Enhancing metacognitive activities by scaffolding them may be a consistent factor during the entirety of the learning process or over a period of time, meaning at the beginning of a new chapter of learning with a gradual fade-out (Rosenshine/Meister/Chapman 1996: 186). Scaffolding is especially suitable for the presentation of flexible and adaptive information in computer-supported learning environments (Lin 2001, Maule 2000, Puntambekar 1995). Lin, Hmelo, Kinzer & Secules (1999: 46) distinguish between four types of scaffolding: process displays, process models, reflective (sensitizing) discourse, and process prompts.

In the case of process displays, the reader must create models of problem-solving and thought processes during a task. With process models, the model of the thought processes already exists thanks to experts. The learner

needs to compare their thinking processes with that of the expert. Reflective discourse provides learners with the component of social interaction as well as the possibility for feedback. The feedback is given externally, either by a fellow learner or by the teachers themselves. With the aid of **process prompts** the learner's attention is focused on certain processes while working through a task. This encourages self-reflection on the part of the learner (Rosenshine et al. 1996). The added value of prompts lies mainly in their encouragement of executive control and managing processes in the learner (Rosenshine et al. 1996). Loosely based on a previously conducted meta-analysis, Rosenshine et al. (1996: 186) carved out six prompting measures: **signal words, generic question stems & generic questions, main idea, question types, story grammar categories** and **no apparent procedural prompts**. With signal words the learner must develop questions himself or herself, for example via interrogative pronouns (who, what, when, where, how, why). With generic question stems & generic questions on the other hand, the reader is presented with prefabricated questions or question frameworks. In the case of the main idea, the reader must first identify the basic message of the section of text before they can pose questions. It is a similar case for story grammar categories. The learner themselves is responsible here for developing questions regarding the central elements of stories and episodes, such as, 'Who decides what happens next? How was it possible, that…?'

Question types are operationalized with three different types: the first two questions fall under the category of factual knowledge questions and the third under inferential knowledge questions. Factual knowledge encompasses questions answerable in the sentences a reader reads next or by integrating several sentences. Inferential knowledge encompasses questions whose answers can be found by reading the text. Finally, in 'no apparent procedural prompts', no questions are generated at all. Instead, the teacher introduces the learner to the technique of asking questions.

The meaning of metacognition mainly grows alongside a growing complexity of tasks. In this case, problem-solving prompts are especially effective. Kauffman, Ge, Xie & Chen (2008) have noted in this regard how prompts are highly effective in problem-solving. Reflective prompts only prove themselves effective when preceded by the presentation of problem-solving prompts. The researchers Chi, De Lee, Chiu & La Vancher (1994) examined the learnability of self-explanations. The study by Berardi-Coletta, Buyer, Dominowski & Rellinger (1995) focuses on the effectiveness

of the prompts in the area of problem-solving. In a meta-analysis, Rosenshine and his colleagues (1996) discussed the effectivity of the indirect intervention of metacognitive strategies involving questions using enhancement measures. Their meta-analysis is based on 26 empirical studies. A meta-analysis conducted by Hattie, Biggs & Purdie (1996) involved more than 50 empirically tested strategy interventions. The meta-analysis by Haller, Child & Walberg (1988) assessed metacognitive strategy communication in text comprehension. The overview of all of these studies emphasizes the role of metacognitive strategies in the learning process (Anderson 2005). However, the sustainability of such programs is yet to be proven.

It is obvious that support measures are effective. What is still unclear, however, is in what combination the discussed basics of strategic support measures – be they direct or indirect – must appear in order for support measure to be effective. It is a question we will discuss in greater detail in the next chapter.

6.4.4 Design and Instruction Principles of Adequate Support Measures

Science has been dealing with the topic of metacognition for over 50 years. These attempts have primarily led to a very important distinction between **metacognitive knowledge** (the declarative aspect) (Ertmer/Newby 1996, Kluwe 1981, 1982, Schraw 2001, Flavell/Wellman 1977), **metacognitive skills** (the executive aspect) (Brown 1978, Veenman 2005) and **metacognitive experiences** (metacognitive judgments and monitoring) (Efklides 2008, Flavell 1979). Over 50 years of research on metacognition has produced a lot of insights into improving metacognitive knowledge, metacognitive skills & metacognitive experiences. Let's have a look at those findings. In order to develop effective metacognitive instructions, it is necessary to know what combination of support measures should be incorporated into teaching practice in order to achieve learning successes. Generally, it is a question directly related to:

- the target group and
- the respective existing circumstances of context, such as duration of intervention, degree of integration of enhancement measures in the context of learning, teaching mode, social forms as well as

teaching method (Brown/Day 1983, Friedrich/Mandl 1992, Hasselhorn 1995).

As a rule, the target groups possess a deficit in production or mediation. In the case of a production deficit, the learner does possess the necessary metacognitive strategic knowledge and the required regulatory skills, however, they may not use his or her available target-adequate abilities and skills or not produce them spontaneously (Hasselhorn 1995). Why? The spontaneous use of learning and memorization strategies depends on the available knowledge of strategies such as their effective regulation and monitoring (Hasselhorn 1992). If a production deficiency exists, then a short-term indirect support measure should be enough to improve learning. In contrast, if the learner has a deficit in mediation, they do not possess sufficient metacognitive strategic knowledge in the first place. This necessitates a direct training measure, with the goal of improving competence through long-term enhancement as mentioned earlier (Drewniak 1992, Ghatala 1986, Hasselhorn/Hager 1998).

In terms of the duration of an intervention, we distinguish between short-, mid-, and long-term measures since it takes time to develop and improve metacognitive knowledge and skills (Pintrich 2000, Zimmerman 2008). However, research has shown that a larger impact of metacognitive strategies could only be identified in follow-up learning sessions (e.g., Bannert et al. 2015; Gidalevitch/Kramarski 2018). The duration is important, as research literature often attributes the absence of training effects to the short-term nature of an intervention (Haller et al. 1988). In this case, there would be no possibility of adequately practicing strategies or automatizing them (Friedrich/Mandl 1992). Sitzmann & Ely (2010) were only able to find stronger effects in learners who were constantly exposed to prompts. An intervention's duration is also important in the study by Sohrabi (2012), as the effects failed to appear with the fade out of interventions. In contrast to Sohrabi's findings, in the study by Sitzmann, Bell, Kraiger & Kanar (2009), learners only profited from prompts in the first four sessions.

When we refer to the degree of integration of a support measure, this describes to what extent a measure is embedded in the context of learning, for instance in class or in the seminar (Paris, Cross/Lipson 1984), or separately in specially designated study sessions. The current state of research condones integrating instructional interventions into the classroom curriculum (Lin 2001). Unz (2000) and Astleitner (1997), however, found that

this did not improve performance in any measurable way. The lack of effects could perhaps be in great part attributed to the fact that the support measures were not specifically integrated into the learning routine. Social forms of support measures can be individualistic or cooperative, and the most prominent measure in cooperative strategy training is likely reciprocal learning, in which the learners switch between the role of the learner and the role of the teacher, as is the case of the reciprocal teaching approach by Palinscar & Brown (1984). Research today, furthermore, supports the component of social interaction in learning strategy programs (McInerney/McInerney/Marsh 1997, Randi/Corno 2000).

> Socially-shared metacognitive regulation in collaborative science learning build on Efklides' initial idea that metacognition and metacognitive regulation are not purely individual phenomenona but have a strong social nature. (Moraitou/Metallidou 2021: ix; see also Vauras/Volet/Iiskala 2021)

The method of teaching is a crucial factor in metacognitive enhancing programs. The method of direct instruction (McInerney et al. 1997, Paris et al. 1984) is most commonly recommended, involving mainly cognitive apprenticeship and problem-based learning (Randi/Corno 2000). When designing teaching measures, the teacher should start off with intensified direct instruction. With increasing competence, the direct instruction should give way to steadily growing self-guidance by the learners themselves.

Despite the studies conducted on the subject of metacognitive support measures, we find current research does not entirely resolve how effective they are. This is a conclusion Friedrich & Mandl (1992: 38) already reached decades ago. There are several problems associated with studies on the effectiveness of metacognitive support measures. Due to the often heterogeneous operationalizations, it is difficult to validly summarize the somewhat contradictory findings of existing studies (Bannert 2007: 101). Bannert and Mengelkamp (2013) summarize several more problems with past studies: almost every study only examines a certain metacognitive prompt. It is, therefore, unclear from which type of prompt a learner may profit most. Relevant research is very important in order to take this (individual) aspect into account in virtual learning environments. It is still unclear why some of the supporting measures are either ignored completely

or used inadequately by the readers. Even though multi-method online measurement procedures (eyetracking, logfile, loud thinking protocols) could offer insights into the work methods of learners involving prompts, there are hardly any studies simultaneously involving several computational measuring procedures. Furthermore, almost all of the studies named above could be referred to as short-term intervention measures. The premise is that the learner possesses a production deficit which must be remedied in the short term. This is the reason why intervention measures often take the component of feedback into account. The studies by Roll, Aleven, McLaren & Koedinger (2011) and Sohrabi (2012) are some of the few cases in which this component is incorporated into the research design while the effects of metacognition have not been extensively studied in the area of creativity (cf. Antonietti et al. 2021).

6.4.5 Summary

- Cognitive learning strategies encompass all processes catering to direct information intake, information processing, and information storage.
- Metacognitive strategies on the other hand refer to processing at the level of metacognition or knowledge about cognition. In comparison to cognitive strategies, metacognitive strategies focus less on the actual learning process, but rather on the control of cognitive processes and one's own learning progress.
- Despite studies existing on the subject, the effectivity of metacognitive support measures is not yet clearly resolved. The problem lies mainly in trying to make valid summaries of the somewhat contradictory findings of existing studies, because of their often heterogenous operationalization (cf. Bannert 2007: 101).
- Furthermore, we can determine that a combination of direct and indirect measures may have synergy effects.
- Beyond that, there are limits to measures based on prompts, be they direct, indirect, or combined. The verbalization prompts are often disruptive to the continuous reading process (Drewniak 1992: 115). While learners with sufficient prior knowledge, intellectual abilities, as well as a certain cognitive developmental level are more capable of using metacognitive prompts to promote their

learning, subjects with less favorable learning preconditions are not able to compensate for the additional strain on their cognitive capacities.

6.4.6 Review Questions

1. What is the difference between learning strategies, cognitive strategies, metacognitive strategies, and learning techniques?
2. What is the essential goal of metacognitive enhancement?
3. Explain why promoting learning strategies in the classroom is effective.
4. What is the difference between direct, indirect, and combined training measures?
5. You are handed a newspaper article and are supposed to get a first impression within a few minutes. Which of the strategies and techniques in this unit would you apply?
6. You wish to make use of a type of prompt discussed in this chapter for your teaching. Which of the prompt types seem especially suitable to you and which too complex and too challenging for the learner?

7 Theories of Multimedia Learning

We now turn to the most important principles of designing multimedia materials. These principles offer teachers a theoretically supported and empirically proven frame of reference for creating materials which combine images and text. These materials may include graphic overviews of regional issues, task sequences for a video, or simply a teacher's own presentation slides for use in the classroom. This chapter deals with the questions of what principles we may derive from multimedia learning theories and how they may be applied to multimedia learning materials. In order to answer these questions, we introduce you to the multimedia learning theory by Mayer (2005a, 2009): a theory combining the most important findings of previous models in an integrated model. Afterwards, we will derive the most important design principles which we will discuss with the current empirical research in mind. The chapter closes with a discussion of several examples of a successful implementation of design principles in learning materials.

Study Goals

By the end of this chapter, you will be able to:

- explain different design principles using theories of multimedia learning
- evaluate and optimise multimedia learning materials in the context of language learning on the basis of these design principles.

7.1 Theoretical Foundations of Design Principles

Many design principles, such as the multimedia principle, seem almost self-evident. According to the multimedia principle, for instance, providing pictures as well as text supposedly leads to improved learning results when compared to learners using text alone. Another example is the signaling principle, which involves emphasizing important aspects of the learning material. Despite being apparently obvious, these principles evolved from complex theories and have been supported by numerous empirical studies. In this chapter, we will begin by taking a look at Mayer's multimedia model (2005a, 2009; see also Clark/Mayer 2016) which establishes the basis for several design principles. By integrating elements of previous models by Baddeley (1986) and Paivio (1990), as well as Sweller & Chandler's (1991; cf. Chapter 6.1) cognitive load theory, Mayer's model attempts to answer the following three questions:

1. How do the various processing channels of the working memory interact with each other during multimedia learning?
2. What is the role of the working memory's limited processing capacity for multimedia learning?
3. Which processes are involved in useful and sustainable multimedia learning?

Regarding Question 1: based on the dual-channel assumption, Mayer (2005a) assumes that multimedia learning involves two separate albeit linked channels for information processing. He differentiates between a visual-pictorial and an auditory-verbal channel, combining aspects of sensory modality (visual versus auditory) and the presentation mode (pictorial versus verbal). Each of these two channels is specialized to process a certain sensory modality and coding type.

Regarding Question 2: Mayer assumes that the processing capacity of the working memory is limited, but different for each of the two channels (cf. limited capacity assumption, Mayer 2005a, 2009), similar to the cognitive load theory (Sweller/Chandler 1991). It means that the visual-pictorial and the auditory-verbal channel each have their own processing capacity independently from one another. In order to avoid cognitive overload, the processing of pictures and text should use the optimal capacity of both channels. Mayer further notes how the limited processing capacity of the two channels does not express itself in the form of a concrete number of items,

because they strongly depend on factors such as chunking (cf. Chapter 3.3), individual learning conditions, practice effects as well as the use of certain metacognitive strategies (cf. Mayer 2005a, 35). Mayer views the latter as a critical function of the "central executive" system postulated by Baddeley.

Regarding Question 3: in the context of the active processing assumption, Mayer (2005a, 2009; see also Clark/Mayer 2016) postulates useful learning being primarily enabled through the construction of mental representations, which make the new input compatible with existing prior knowledge. The processes required for constructing mental representations were previously determined in one of Mayer's earlier models: the selection, organization, and integration model (SOI model; cf. Mayer 1996). First, information from the input is perceived and selected. Then, the various pieces of information are related to each other within the working memory and organized into a coherent mental representation. Finally, this mental representation is integrated into existing knowledge structures. The structure of the learning materials either benefits or inhibits these processes. The representation of the main idea of a text, for instance, along with its subordinate specifications, in form of a hierarchical tree structure may help the learner to understand the connections and to organize a coherent mental representation (Mayer 2005a; see also Clark/Mayer 2016).

In light of these three fundamental assumptions, Mayer formulated the **cognitive theory of multimedia learning**, depicted in the following figure (see Figure 7.1). Mayer assumes three components of human memory: in the first step, visual (images, written words) and auditory stimuli (spoken words or sound) are perceived in the sensory memory through the appropriate sensory organs and are then transmitted to the working memory. There, information, depending on its coding (pictorial or verbal), is processed further into verbal or pictorial models using cognitive organization processes. The arrows inbetween the sounds and images illustrate that words may, for example, activate the respective mental images through referential processes. In a final step, integration processes join the verbal and pictorial models and activate the relevant prior knowledge to form a holistic mental model.

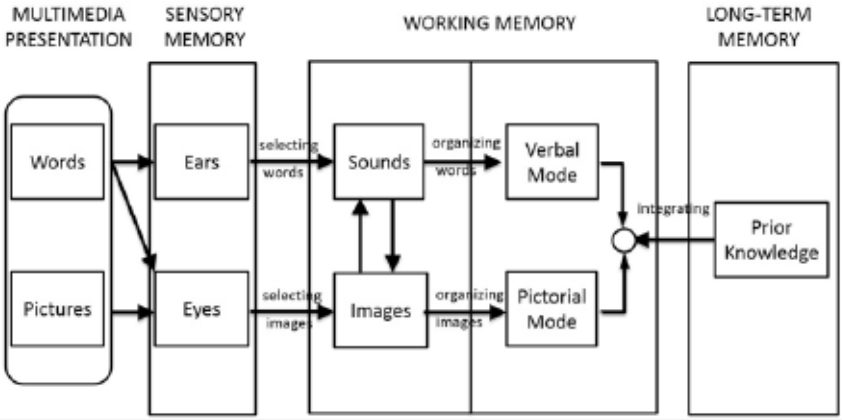


Figure 7.1: Cognitive theory of multimedia learning (according to Mayer 2005b: 37)

Mayer's model does not consider all paths of word recognition described in the model by Coltheart, Rastle, Perry, Langdon & Ziegler (2001) (cf. Chapter 6). According to Mayer's model, the lexical path passes through an orthographic decoding process for the visual typeface of the respective entry in the mental lexicon. The visual typeface activates the represented word directly through referential processes without the respective sounds being generated through the grapheme-phoneme correspondence. The model by Mayer (Figure 7.1) should be supplemented with an additional arrow in order to properly consider this particular path of language processing. It would lead from 'images' directly to the verbal mode. The prelexical path mentally reconstructs the sound form of a word letter by letter through grapheme-phoneme correspondences, and is depicted in the model through the connection between images and sounds.

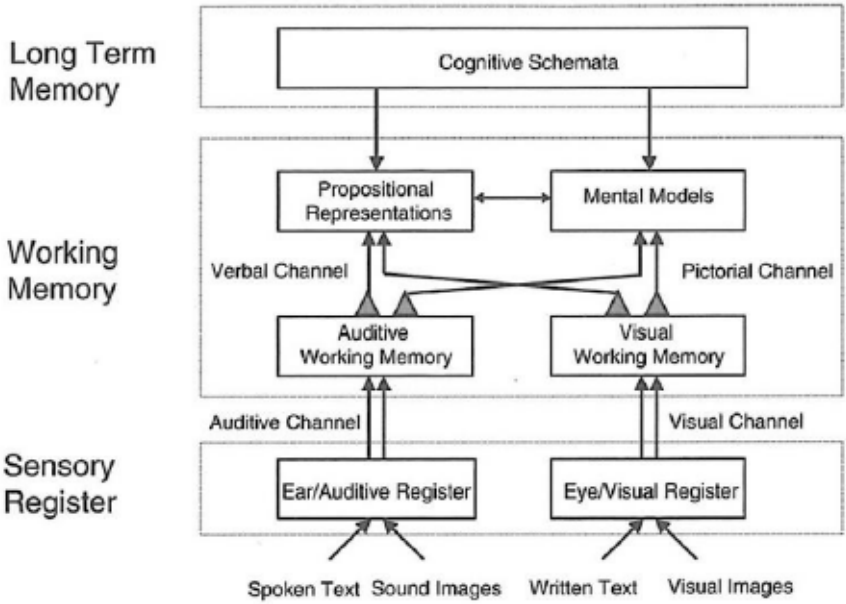


Figure 7.2: Integrated model of text and image processing (Schnotz 2005: 57)

In a similar model, reminiscent of Mayer's model in many points, Schnotz (2005; see Figure 7.2) solves the problem of the different processing paths by not assuming strict auditory-verbal and visual-pictorial channels (also cf. Gyselinck/Jamet/Dubois 2008: 359). In this way, the written text must not necessarily run through the preset path of the visual to the auditory working memory in order to create a verbal model (cf. Suñer 2011: 105). Compared to Mayer's model, Schnotz (2005: 59) implements additional important changes, as he no longer differentiates between a verbal or pictorial model as a preliminary stage to the holistic mental model. Rather, his model suggests that images have faster access to the mental models through the pictorial channel, while the language-based input initially leads to the formation of a propositional representation and only then is processed further into a mental model. With that, the model does justice to research that finds mental models to be closely connected to visual-spatial information in processing (cf. Friedman/Miyake 2000, Sims/Hegarty 1997), as well as to the corresponding simulations of certain situa-

tions and issues (cf. Seel/Darabi/Nelson 2006, Seel 2008). Separating image-based representations and the mental model within the working memory shows how both mental representations cannot be equated with one another (cf. Knauff/Schlieder 2005). Researchers have found how irrelevant details of mental images often inhibit thinking processes under certain circumstances, and in this way may prevent the formation of mental models (Knauff/Johnson-Laird 2002, Knauff/May 2006).

7.2 Implementing Design Principles

The previous findings lead us to several important consequences to note for the practical use of design principles. Multimedia learning material must be carefully prepared in order to avoid, among other things, unnecessary image details for the formation of mental models, thereby hindering sustainable learning. This means, in consequence, there is no general advantage in using materials consisting of images and text (cf. **multimedia principle**, Mayer 2009; see also Clark/Mayer 2016). Principles such as the **relevance principle** (providing relevant information), the **redundancy principle** (avoiding providing the same information twice) or the **signaling principle** (emphasizing important elements in the learning material) are rather meant to mainly ensure the initiation of relevant learning processes through the provided multimedia materials, and avoid allocating cognitive resources unnecessarily (Mayer 2009; see also Clark/Mayer 2016). One can avoid overexerting the individual processing channels in the working memory by supplying the pictures and text parts of the learning materials in different sensory modalities, thereby using the capacity of the channels optimally (cf. modality principle). The effectiveness of these and other design principles, however, depends on the learner's prior knowledge. Implementing these principles may be counterproductive in the form of the **expertise reversal effect** (cf. Kalyuga et al. 2003, Sweller 2004, Plass et al. 2010), where too much guidance may affect more experienced learners negatively. Finally, we should remember when implementing design principles that, usually, they cannot be directly reapplied to the foreign language context. One should, therefore, try to understand changes in conditions that may affect the effectiveness of any given principle.

With these different contexts in mind, we will present individual design principles in the following sections. First, we will describe principles based on Mayer (2009; see also Clark/Mayer 2016) using various examples and then current corresponding empirical findings. Finally, where available, we will present additional results from the field of L2 learning, as these diverge from the results of studies with subjects who are L1 speakers. As about 30 design principles have been formulated and researched to date overall (cf. van Merriënboer/Kester 2014, Roche/Suñer 2019), we will limit ourselves only to the following three principles: the **modality principle**, the **contiguity principle**, and the **redundancy principle**.

7.2.1 The Modality Principle

According to van Merriënboer & Sweller (2010: 89), the modality principle is defined as follows: "Replace a written explanatory text and another source of visual information (unimodal) with a spoken explanatory text and the visual source of information (multimodal)". Supposedly, simultaneously presenting text and pictures is the best way to combine two different sensory modalities in order to optimally use the two processing channels and avoid a possible cognitive overload (cf. Low/Sweller 2005, Brünken/Plass/Leutner 2004). Here is a concrete example: one of your colleagues wishes to prepare a tutorial for a teacher's tool used for the creation of quizzes. They intend to explain the various steps for creating a quiz by showing and commenting on the various on-screen actions. You are now being asked whether providing comments regarding the on-screen actions would be more effective if presented orally or in writing. In this case, an audio presentation of the comments seems more appropriate, as the linguistic part of the information would be exclusively conveyed through the auditory-verbal channel and the screenshots through the visual-pictorial channel. A simultaneous presentation of written text and screenshots could perhaps dangerously split the attention of the learners while they are processing the information (both can only be perceived visually). The resulting verbal and pictorial models created in these cases would not, in this case, be successfully related or integrated with each other during processing. Empirical research has proven the efficiency of the modality principle multiple times (cf. for instance Mousavi/Low/Sweller 1995, Tindall-Ford/Chandler/Sweller 1997, Jeung/Chandler/Sweller 1997, Mayer/Moreno 1998, Moreno/Mayer 1999, Moreno/Mayer/Spires/Lester 2001, Moreno/Mayer 2002, Craig/Gholson/Driscoll 2002). In the study by Mousavi et al. (1995) researchers observed how the combination of a diagram and a spoken text was more effective when solving a geometry problem than the combination of the diagram with written text (cf. Mayer/Moreno 1998). Furthermore, in a meta-analysis on the basis of a total of 21 experiments regarding the modality principle, Mayer (2005b: 177) proved the average strength of the effect to be 0.97 (strong effect). Therefore, the modality principle is grounded in a relatively solid empirical foundation.

However, other experiments show the modality principle as not contributing unconditionally. Sweller (2004, 2005; also cf. Rummer/Fürstenberg/Schweppe 2008) has found the principle to only appear when picture

and text processing are supposed to take place simultaneously and the learner is supposed to be induced to split his or her attention (cf. **split attention effect**, Chapter 7.2.2). This is the case, for example, when a book shows a graph of the rising number of foreign language learners worldwide on one page, and the corresponding explanation on the following page. In this sense, the modality principle contributes to the reduction of extraneous cognitive load because of the distribution of the information onto the different pages. Leahy, Chandler & Sweller (2003) were able to prove in their study how this added value to the task: learners who worked with learning materials consisting of a diagram alongside audio explanations not comprehensibly isolated from one another performed better than learners who were provided with a diagram and a visual presentation of the explanations. The authors note, however, that we only see an advantage of multimodal presentations of learning materials when these materials necessitate a substantial intrinsic cognitive load. For example, when the various elements of the learning materials exhibit a high degree of interactivity and, therefore, are demanding in terms of content processing (also cf. Tindall-Ford et al. 1997). In an additional experiment, Leahy et al. (2003) also found that the modality principle does not produce any learning advantages if a self-explanatory diagram is provided with additional auditory explanations. As the auditory presentation of the explanations in this case is superfluous, this kind of double presentation of information may result in a decrease of learning performance. In the experiment, the group without additional explanations performed better than the group provided with auditory explanations. Mayer summarizes the negative effect of a double presentation of information in the form of the aforementioned redundancy principle (Mayer 2009, Clark/Mayer 2016; also cf. Sweller/Chandler 1991). Furthermore, Ginns (2005) found in his meta-analysis of 43 empirical studies that the multimodal presentation of learning materials does not present an added value in terms of learning, if the learner is able to control the playback of the spoken text parts, for example with a playback device or button (also cf. Betrancourt 2005).

To this day, there have been few empirical studies on the relevance of the modality principle in the context of foreign language learning. An exception is the study by Suñer (2011), a study comparing three different analyses of hypertexts (cf. Chapter 5):

Group 1 within the study was presented with a purely text-based hypertext consisting of a hierarchical navigation bar and a written hypertext node

(only written text); Group 2 with a multimedia hypertext consisting of a graphic overview as navigational interface and a written hypertext node (pictures and written text); Group 3 with a multimodal hypertext consisting of a graphic overview as navigational interface and auditory hypertext nodes (image pictures and audio).

The results of these tests conducted with respect to text comprehension consistently show without a doubt that only Experimental Group 2 (image picture and written text) performed significantly better than Experimental Group 1 (only written text). Experimental Group 3 (image picture and spoken text) performed better than Group 1 (only written text), but only slightly. The author, therefore, concludes that the multimedia principle (presenting image and written text together is more beneficial to learning than only written text) is seemingly more relevant for L2 language acquisition than the modality principle. The author explains the conditional relative efficiency of the modality principle in association with Schnotz's (2005) **control-of-processing principle.** According to this principle, the visual presentation of texts using static pictures is more advantageous in difficult texts and with limited learning time than using an auditory presentation. The different nature of the respective stimuli information plays an important role in the superiority of the visual presentation of a text as compared to an auditory presentation. The learner can barely influence the processing speed with spoken language, because of its fast pace and volatility. By contrast, the learner can adapt the processing speed of written language to his needs, due to the stability of visual cues (for instance adjusting the speed when reading thematically difficult texts). Even controlling playback when using audio text may not be helpful, as the speed of the recording remains the same, even if repeated. The fleetingness of animated pictures can also cause the learner to have little overall control over the speed of the simultaneous processing of text and pictures. They feel forced to quickly switch between animated pictures and written text. The ensuing cognitive overload (split attention) may be avoided by using the playback controls, so the learner may pause the animation at will. These instructional design measures have already been used successfully in several studies on grammar teaching (Arnett/Suñer 2019). In another study, Repetto et al. (2017) found out that learning L2 vocabulary through L1 translations and gestures was more effective than using L1 translations and pictures. Although these effects could not be observed across all age groups (see Andrä

et al. 2020 for a study on L2 vocabulary learning by primary school children), the findings support the idea that avoiding the split attention effect (L1 translations and pictures are both processed visually) might be beneficial for L2 learners.

7.2.2 The Contiguity Principle

The **contiguity principle**, summarized by van Merriënboer & Sweller (2010: 89) under the term **split attention effect**, is defined by the authors as follows: "Replace multiple sources of information, distributed either in space (spatial split attention) or time (temporal split attention), with one integrated source of information". The principle is best explained in light of the theories on multimedia learning presented earlier (Mayer 2005a, 2009, Clark/Mayer 2016, Schnotz 2005). The principle is meant to help avoid cognitive overload, a possible result of a temporal or spatial separation of text and picture. The attempt to relate text and picture information (information not presented simultaneously either temporally or spatially) in the working memory results in an increased consumption of cognitive resources, and is commonly accompanied by a decrease in performance (cf. Sweller 2004). Hence, by integrating images and words into the learning environment, the split attention effect may be reduced. This seems to support the simultaneous processing of both types of information in the working memory (cf. Schnotz 2005: 61). According to Clark & Mayer (2016: 91), the effort to reduce the split attention effect should not only concern the presentation of images and texts in general, but also a series of additional aspects relevant for learning materials and language learning platforms. According to Clark & Mayer (2016: 5), attention splitting may have a learning inhibiting effect in the following situations:

- separate presentation of diagrams and text on scrolling websites
- separate presentation of questions and their respective answers or feedback
- separate presentation of content in various browser windows
- simultaneous presentation of written text and animations
- use of a legend to explain individual parts of a diagram.

In reference to the contiguity principle, researchers commonly differentiate between temporal and spatial contiguity (cf. Mayer 2009, Clark/Mayer

2016). Following the work by van Merriënboer & Sweller (2010), we will be treating both of these aspects as one, as they can be ascribed to the same cognitive effect, i.e., the split attention effect. In the literature, the appearance of the split attention effect is associated with the extraneous cognitive load and, for this reason, typically associated with the type of presentation of the learning material rather than its difficulty. Several studies were conducted regarding this particular source of extraneous cognitive load, and compared non-integrated learning materials and physically integrated learning materials (cf. Mwangi/Sweller 1998, Chandler/Sweller 1996, Cerpa/Chandler/Sweller 1996, Sweller/Chandler 1994, Mayer/Sims 1994, Ward/Sweller 1990, Kester/Kirschner/van Merriënboer 2005). Kester et al. (2005) compared two groups of learners using differently prepared learning materials who were occupied with the mechanisms behind electric circuits: one group studied the subject using a diagram which featured several pieces of spatially integrated procedural information. Another group worked with the same diagram, with the difference that this diagram lacked integrated procedural information. The results of the performance test showed the group with the integrated learning materials outperforming the other group in tasks involving electrical circuitry problems. Such problems were markedly different from the practical examples provided in the learning phase. There was no significant difference between the groups in terms of performance when solving problems similar to those presented in the learning phase. This kind of unsystematic appearance or lack of coverage of the effect of the contiguity principle has been observed in other studies as well (cf. for instance Kester/Kirschner/van Merriëboer 2004a, 2004b). These findings are in contrast to the results of two meta-analyses by Mayer (2009), in which he was able to show a large average effect of the spatial and temporal contiguity principle (d= 1,09 and d= 0 1,31; cf. Mayer 2009: 135 and 153). Regarding the overall picture, it is fair to assume that the appearance of the contiguity principle is tied to certain limitations.

In line with the modality principle, the presence of high intrinsic cognitive load presents one of the most important limitations, according to Sweller & Chandler (1994: 122). Furthermore, Ayres & Sweller (2014) point out that the spatial integration of text and picture does not result in an increase of learning performance if the text content merely describes the image and does not provide any new, supplemental information (also cf. Mayer 2009: 135). An increase of the learning performance in this case is achieved by omitting redundant information (cf. Ayres/Sweller 2014, cf.

redundancy principle below). Ciemiak, Scheiter & Gerjets (2009) were able to ultimately show how the contiguity principle not only reduces extraneous cognitive load, but also increases learning-related cognitive load. Other studies (cf. Kester/Kirschner/van Merriënboer 2005, Tabbers/Martens/van Merriënboer 2000) confirm these findings: despite significantly higher learning performances within the group with integrated learning materials, the cognitive load remained the same. In this line, a recent study by Yum, Cohn & Lau (2021) has demonstrated that integrated text-picture presentations in L2 lead to richer comprehension when compared to independent text-picture presentation. However, this effect could not be observed in L1 reading comprehension. We can conclude, therefore, that the use of the contiguity principle frees up cognitive resources for schematization processes leading to a better balance of the three types of cognitive load overall.

7.2.3 The Redundancy Principle

This last section revolves around an additional, seemingly self-evident design principle: the redundancy principle. Nevertheless, the principle still is affected by certain limits, especially in terms of foreign language learning. Van Merriënboer & Sweller (2010: 89) formulate the principle as follows: "[r]eplace multiple sources of information that are self-contained (i.e., they can be understood on their own) with one source of information". Mayer's (2009: 124) definition of the redundancy principle, in contrast to van Merriënboer & Sweller (2010), merely refers to the simultaneous presentation of images, spoken text and written text and describes the associated overload of the processing system as follows: the simultaneous perception of images and written text via the eyes as well as the attempts to relate the language-based information from the spoken and written text to each other lead to an increase of the extraneous cognitive overload. Consequently, Mayer (2009: 124) advises against a double presentation of verbal information (auditory and visual) and, instead, argues for a presentation of pictures and text according to the previously discussed modality principle. This definition contrasts with the somewhat broader definition of the redundancy principle according to Sweller (2005). His version refers to a double presentation of text and/or pictures in any form as well as the presentation of superfluous explanations regarding the learning materials. This shows in turn that there are fluid transitions between the many design

principles. Mayer (2009) summarizes the aspect of coherence under the coherence principle: if the learner cannot perceive a coherent connection between the various elements of the learning material, this results in an increase of the extraneous cognitive load.

Mayer (2009: 126) presents five of his own experiments (such as Moreno/Mayer 2002) which were able to prove the superiority of groups using non-redundant learning materials in comparison with groups using redundant learning materials. Mayer attributes the positive effects to the avoidance of overload on the auditory-verbal channel. Even though the average effect sizes of the five studies ranged from medium to strong (d= 0.72), Mayer notes that the appearance of such effects is linked to various conditions. According to these, the learners do not profit from the redundancy principle in short texts or in the representation of abbreviated subtitles for spoken texts. Beyond this, more recent studies have found this principle behaving somewhat differently in the context of foreign languages.

In a comprehensive meta-analysis of more than 57 independent studies, Adesope & Nesbit (2012) investigated under what circumstances a double presentation of language-based information is superior to a simple presentation. It turned out that an advantage was mainly found in learners with a low level of prior knowledge when using system-based and purely linguistic learning materials. Mayer & Johnson (2008) also observed a positive effect of redundant learning materials. In the supplementation of short headings for various diagrams, to be precise. These headings were described in greater detail by audibly presented explanations. In this case, the headings aided the learner categorizing the terms from the spoken texts and attributing them to parts of the diagram. Redundant learning materials also seem to be beneficial in foreign language contexts: Mayer, Lee & Peebles (2014) were able to show in a first experiment how the presentation of redundant pictures in connection with spoken text content aided non-L1 students in achieving greater learning success than merely providing the spoken text. A second experiment, however, was not able to prove that providing subtitles in a video was beneficial for learning. The results of this second experiment contrast with the results of the study by Mitterer & McQueen (2009), during which foreign language learners were able to comprehend a film involving the use of dialects significantly better when provided with captions rather than without captions. It appears that, in some cases, the presentation of verbal information in the visual modality

helps the learners to better segment spoken texts. Other recent studies have also found positive effects of captions on L2 vocabulary learning (Pujadas/Muñoz 2019, Chen et al. 2018) and on L2 listening (Peters 2019). However, some studies suggest that the positive impact of captions on L2 listening and L2 grammar gains might be modulated by other variables such as L2 learners' modality preferences (visual vs. auditory) (Lee et al. 2019, Lee/Révész 2018) or the working memory capacity (Kam, Liu/Tseng 2020). As a consequence, the positive effects of redundancy on L2 learning should not be overgeneralized.

Experiment 2

Let's give it a try: watch a few scenes from your favourite TV series in a foreign language. Try to select those that contain colloquial language. The first time watch the scenes without subtitles and write down what you understand. Then, turn on the substitles and watch the scenes again. Did the subtitles help you better understand dialogues? Did you get far more details from the scenes?

7.2.4 Summary

- Mayer's cognitive theory of multimedia learning has proven to be a productive theoretical framework for design principles.
- The cognitive theory of multimedia learning has three main assumptions:
  1. Mainly two separate, but interconnected processing channels are involved in multimedia learning.
  2. The working memory possesses a limited processing capacity, different for each of the two channels.
  3. Meaningful multimedia learning is based on the processes of information selection as well as the organization and integration of existing prior knowledge.
- In order to gain an added value by combining text and image, certain principles need to be taken into account (such as the relevance principle, the redundancy principle, and the signaling principle), but their effectiveness depends on the learner's prior knowledge.

- We must distinguish between the contexts of L1 and L2 acquisition, as the multimedia principle is of greater relevance to L2 language acquisition than the modality principle. This is because the visual presentation of texts gives L2 learners more control over the processing speed due to the stability of the stimuli and compared to the fleeting auditory stimuli of spoken language.

7.2.5 Review Questions

1. What are the biggest differences between Mayer's and Schnotz's theories on multimedia learning?
2. Under what circumstances does the modality principle provide no added value in terms of learning?
3. How would you explain the contiguity principle in the context of the cognitive theory of multimedia learning?
4. Under what circumstances are redundant learning materials beneficial for learning?

8 Cognition and Language Teaching

The book intends to show how language learning and teaching can be optimized by focusing on language processing in learners' brains. In conventional language teaching, we find a strong focus on inflexible methods, standardized activities, one-size-fits-all teaching recipes such as rote learning, and other attempts to motivate learners to learn a new language. Most often those attempts are well-intended but restricted to essentially-cheering learners on from a distance. If we want learners to use a language extensively, correctly, and creatively, then we need to reach their brains, hearts, and souls. This book advocates a cognitive approach to language teaching and learning as being the most promising one in achieving this goal. Therefore, crucial facets of the processing of language in the brain are highlighted in this book, with respect to the cognitive 'hardware' and, more extensively, with respect to the cognitive 'software'. The respective chapters serve to give a reader insight into vast, complex, and fascinating fields of study, all relevant to language teaching and learning, but often and widely neglected in conventional teaching method approaches. Sometimes, one may find buzzwords such as media use, authenticity, learner autonomy, intercultural competence, CLIL, communicative language teaching and others in conventional curricula and on book covers, but their actual contents remain opaque. In this chapter, we refer to previous discussions in this book in an attempt to generate a summary which lends itself in particular to language teaching. To that end, we have developed a model of a cognitive approach to language learning and teaching. We summarise the cognitive linguistic basics of this paradigm shift, as well as present its applications to language acquisition. Chapter 8 summarizes the basics of cognitive language pedagogy. Chapter 8.1 then explains and illustrates the idea of transfer difference as a key component of this model. We show how concepts vary depending on their specific linguaculture and how language teaching needs to address this kind of intercultural drift. Chapter 8.2 focuses on how cognitive language pedagogy and task-based teaching connect with each other. We show how the principle of usage-basedness may be operationalised in task-based language teaching.

8.1 Foundations of a Cognitive Approach to Language Learning and Teaching

The Hardware

The 'hardware' for language processing in the brain consists of an interconnected system of areas involved in various aspects of language processing, such as emotion, hearing, smelling or motor function. The main language areas of the brain are Broca's area and Wernicke's area. They are primarily involved in language production and structural aspects of the language and language comprehension and semantic information, respectively. Different languages are not located in different areas of the brain as previously thought. They reside in the cellular network within the known language areas of the brain. The physical structure of the brain cannot be the target of pedagogical approaches, as is sometimes suggested. It would be too difficult to locate certain brain activities, in particular in a class with many learners, and to intervene into such activities from the outside. However, it is important to know how the brain is set up for language learning and what its abilities are.

Language Processing

Even more important is the knowledge of processes involving language production, comprehension, acquisition, and attrition, that is, the psycholinguistic basics. The phases of language processing include the following:

1. Conceptualization phase: a preverbal message is created and adapted to the communicative situation.
2. Formulation phase: the necessary lexical knowledge is retrieved from the mental lexicon and morphologically, phonologically, and phonetically encoded.
3. Articulation phase: the phonetical plan is created, containing all the information required for the articulatory realization of the message.

The processing paths of language production and comprehension use are analogous: the parser perceives the external language and translates it into a kind of message. Its meaning is then analysed by the conceptual system. Parsing encompasses several processes during comprehension: word recognition via the mental lexicon, analysis of the syntactic relationships

between the words, and semantic interpretation. The monitor supervises all processes and can interrupt any part of the subsequent production if necessary, to reformulate the preverbal message. Formulation and articulation errors have negative effects on the comprehensibility of the message and necessitates different corrective procedures. The mental lexicon, the central reservoir in language processing, is structured like a network and organized dynamically. As evidenced by various language phenomena (such as TOT, speech disorders, and slips), the mental lexicon contains several interconnected levels (semantics, syntax, morphology, phonology). Word entries in the mental lexicon are divided into the two large areas: lemmas and lexemes. In the case of multilingualism, all of the languages are stored in the same mental lexicon and in the same semantic-conceptual system. The modified hierarchical model (MHM) by Pavlenko (2009) provides an explanatory approach on how word forms are linked to the conceptual level. There may be no overlap, partial overlap or complete overlap and conceptual elements can be transferred from one language to the other. As a result, language teaching can support vocabulary acquisition through a combination of explicit instructional measures and sufficient input in the form of authentic texts. Successful vocabulary acquisition includes formal aspects (word form, orthography, morphology, etc.), semantic aspects (conceptual features, associations, etc.), and pragmatic aspects (grammatical functions, collocations, register, etc.). When a learner experiences word finding problems, the teacher should encourage them to take risks in communication and to try reconceptualization strategies or gap fillers to solve the word finding problems effectively while speaking. The training sessions should direct the speaker's attention to the different types of strategies as well as their communicative potential. When building his or her vocabulary, the learner should create links to related words where possible (for instance conceptual, taxonomic) so that they can access the word through various channels.

Construction grammar assumes a close interconnection between language and cognition and views grammar as a cognitive construct. Another advantage of the constructionist model is that the meanings of the individual words are defined in relation to the larger sequences they appear in. Consequently, constructions are not regarded as isolated. They are a part of a structured construction inventory. It is useful and of the greatest necessity in language teaching and learning to list the most important constructions

in a foreign language in the form of an inventory with prototypical constructions and their instantiations. De-chunking strategies can help learners discover the systematicity in such constructions. Cognitive linguistic approaches offer a great deal of potential, because they describe language in a way that gives learners easy conceptual access (Suñer/Roche 2019: 5–10).

Metaphorization

Cognitive linguistics distinguishes itself from other linguistic approaches by defining language as a means of conceptualizing reality, not by formulating abstract rules. Cognitive linguistics assumes that language is a meaningful system of symbolic structures which can be explained using principles of general cognition and cannot be generated by a fixed set of instructions. Usage-based means that reality is generated by the interaction between individuals in a particular cultural context and acquired through general learning mechanisms. Among other things, prototype effects, metaphorization, and polysemy are suitable means to explain the lexis and the grammar of a language and its acquisition.

Even though bodily experiences and mental images are used differently cross-linguistically, all languages have the process of metaphorization in common. In this process, a certain conceptual content is projected from the source domain on to the target domain. Metaphors are, therefore, dynamic and productive and can prove to be an important means of expression for complex abstract circumstances in all kinds of contexts. In foreign language acquisition, metaphors are used as early as the beginner learning levels. In fact, the salience and relevance of the structures of a target language are very significant to acquisition. They are often more important than L1 structures.

Metaphors can illuminate basic concepts of the language beyond their lexical value as they are not only evident in vocabulary, but also in grammar and textual concepts. They structure our perception and how we put the world into words. The linguacultural differences of metaphors are relevant for multiple reasons: they allow insights into and comparisons with other cultures, they indicate language-typical possibilities of verbalization, and they are extremely effective when being ascribed to their source domain. Metaphors are based on cross-linguistic image schemas (up - down, early

- late, duration), even though they exhibit language-typical perspectivizations, such as those referring to openness, repetition and others. It is a common feature of languages that most spatial concepts are also represented in temporal concepts. Due to its level of physical concreteness, the source domain offers mostly sustainable learning possibilities and ways of determining unknown metaphors. Metaphors are omnipresent in all known languages and form their elementary foundations. It is, therefore, sensible to incorporate them into teaching and foreign language acquisition at an early point and not to leave them for advanced classes.

Meaning Construction in Reading

When decoding language, both bottom-up and top-down processes are employed to generate meaning. Readers use three different types of mental text representations to generate meaning: textual surface, propositional text base, and the mental model. At the textual surface, aspects such as word order, declination, and orthography of the text are represented in the working memory for a short period of time. At the text base, the linguistic form is less relevant while the semantic content is of more significance. A reader creates mental models of a text when prior knowledge bases are integrated extensively for the interpretation, assessment, and expansion of text content. These three mental text representations are involved to varying degrees with the reading process. Grasping the textual surface is a matter of comparatively simple word decoding processes, while mental model formation requires deeper comprehensive processes to be triggered. As with metaphors, intercultural and interlingual differences can be used productively in order to produce salience. Intercultural and intertextual comparison of parallel texts builds and strengthens an awareness of how texts are constituted as realizations of various text types and products of text type networks. To this end, contrastive textology performs cross-linguistic and cross-cultural analyses of such text types and products in accordance with empirical criteria. Textual comparison also introduces and reinforces strategies for inferential reading. The objects of these analyses are parallel texts produced in different languages. Parallel texts mirror different cultures in comparable communicative circumstances. They can be used as expressive devices that help recognize unconventional concepts in texts.

Meaning construction through reading and listening is not a linear process but rather dependent on previous knowledge and inferencing processes. Hypertexts, which consist of different nodes and references, are well-

suited for demonstrating this non-linearity. The constitutive features of hypertexts are: manifestation of textual links, creating non-sequential bonds between texts, forcing readers to apply their own operationalization of texts and engage interactively with them through, e.g., navigational choices. The hypertextual nodes contain content that is connected by multiple links according to varying content-based criteria. The structure of hypertexts strongly depends on the type of links connecting the nodes and is crucial to how much freedom the readers have in choosing the order of the nodes. Since hypertexts make transparent the processes of meaning construction, they are more than a fancy tool in a language class. Rather, they offer diverse applications for teaching practice starting on the beginner's level but developing their full potential on the intermediate and advanced levels.

In order to help learners decode a text they need to build up and use a sound knowledge base. In addition, they need organizational strategies to help them structure text content, such scaffolding and graphic overviews, and elaborative strategies to help them access it. Cognitive learning strategies, on the one hand, encompass all processes catering to direct information intake, information processing and information storage. Metacognitive strategies, on the other hand, are required to process the knowledge on cognition itself. In comparison to cognitive strategies, metacognitive strategies focus less on the actual learning process, but rather on the control of cognitive processes and the management of one's own learning progress. While learners with sufficient prior knowledge, intellectual abilities, as well as a certain cognitive developmental level are more capable of using metacognitive prompts to promote their learning, subjects with less favorable learning preconditions are not able to compensate for the additional strain on their cognitive capacities.

Multimediality, Multimodality, Multicodality

Cognitive capacities can be enhanced by applying various design principles to the production and use of learning materials. For instance, the cognitive load theory describes the different cognitive load effects arising in the interaction between learning materials and the learner's cognitive structures. Three types of cognitive load are to be managed during learning: the intrinsic, extraneous, and germane cognitive load. Optimally, they are balanced, so that the capacity of the working memory is not exceeded.

Overall, Mayer's cognitive theory of multimedia learning proves itself to be a productive theoretical framework for the formulation of design principles. It has three main assumptions:

1. Mainly two separate, but interconnected processing channels are involved in multimedia learning (dual coding).
2. The working memory possesses a limited processing capacity, different for each of the two channels (cognitive load).
3. Meaningful multimedia learning is based on the processes of information selection as well as the organization and integration of existing prior knowledge.

The dual coding theory requires us to differentiate between multimediality (processing differently coded information) and multimodality (processing information using two or more sensory modalities). When language and visual information are processed, language and images are joined together in three types of processes: representational, referential, and associative processes. However, L1 and L2 learners seem to have different processing preferences, as the multimedia principle is of greater relevance to L2 language acquisition than the modality principle. This is because the visual presentation of texts, as for instance in electronic hypertexts, gives L2 learners more control over the processing speed due to the stability of the stimuli and compared to the fleeting auditory stimuli of spoken language. In order to gain an added value in combining text and images, certain principles need to be taken into account (such as the relevance principle, the redundancy principle, and the signaling principle), but their effectiveness depends on the learner's prior knowledge.

Joining Media and Metaphors

Grammatical metaphors can aid in modifying cognitive linguistic principles so that learners can grasp the most important elements without further explanation. Animations are a form of presentation suitable for representing the dynamic elements of grammar. However, the presentation of animated grammatical metaphors does not automatically lead to better learning results. Rather, the learner needs to look actively at the grammatical metaphors taught and use them as a learning strategy when applying them to other contexts. Apart from the explanatory approach, the choice of grammatical metaphors and the presentation form, aspects of learner dimensions

(types of learners, interests, learning traditions, prior knowledge, etc.), and teaching methods (inductive/deductive, collaborative/individual, etc.) play an important role.

In the following chapters we will elaborate on how the cognitive principles summarized in the previous and present chapters can be brought to fruition in a comprehensive, cultural-sensitive cognitive approach to language teaching and how this approach can be applied to a task-based model of language teaching and learning.

8.2 Transfer Difference in Cognitive Language Teaching

In this chapter, you see how the cognitive principles summarized in the previous chapters can be brought to fruition in a comprehensive, cultural-sensitive cognitive approach to language teaching that combines cognitive linguistics, language processing and language acquisition research, and language pedagogy. First, we provide a brief overview of the theoretical fundamentals of language teaching based on cognitive linguistics (cf. Chapter 1.1). The pedagogical task of bridging conceptual differences occurring in contact with other languages is at the centre of subsequent discussions. Mental concepts may vary strongly depending on the culture, and these need to be taken into account in language teaching. We show that **transfer difference**, therefore, constitutes the key interface between the linguacultures involved in language learning. Transfer difference is illustrated in the area of modality as expressed in modal verbs.

Study Goals

By the end of this chapter, you will:

- understand the connection between cognitive linguistics and language teaching
- be familiar with the roles of metaphorization and the meaning of metaphoric competence in language learning
- be familiar with the meaning and use of procedures involving cultural contrasts
- learn how to operationalize culture-contrastive procedures in the concept of transfer difference
- be familiar with the meaning and use of procedures involving cultural contrasts
- operationalize culture-contrasts.

8.2.1 Cognitive Linguistics and Language Teaching

Understanding lexicon and grammar as a continuum in language teaching, instead of focusing on formal aspects, is a central aspect of the paradigm change currently under way in language pedagogy. The cognitive linguistic approach assumes that grammar and lexicon form a continuum of symbolic units possessing a phonological pole (including orthographic information) and a semantic pole (including discursive and pragmatic information). In other words, one of the most far reaching assumptions for language teaching derived from cognitive linguistics it that both lexicon and grammar have meaning. In the context of language teaching, grammar often appears to learners as a murky field with random, confusing and non-transparent rules, whose semantic function is also not immediately clear. Therefore, it seems all the more imperative to teach grammar as a meaningful and comprehensible basic structure of language, a concept not fundamentally different to the lexicon.

As you have already seen in Chapter 2.1, a second central aspect of the paradigm change in language pedagogy concerns the assumption of language being an integral component of human cognition. As a consequence, language and grammar are not considered to consist of arbitrary signs and abstract rules but are conceptually motivated by general cognitive principles. These cognitive principles refer to, among other things, metaphorization (cf. Lakoff/Johnson 1980; Chapter 2.1), prototyping (Geeraerts 1989, Rosch 1978; see also Chapter 1.1) and imagery (see also image schema in Evans/Green 2006, Johnson 2005, Oakley 2007; see also Chapter 2.1 and conceptual **archetypes** according to Langacker 2000, 2008b). When taking the findings of neighbouring cognitive sciences into account, cognitive linguistic approaches attain a higher cognitive plausibility in language description as well as in language acquisition research (cf. **cognitive commitment**, Evans 2012; also cf. **converging evidence**, Langacker 2011; cf. Niemeier 2017). In our approach, metaphorization plays a central role in explaining language description, but also in language teaching (cf. Littlemore 2016, 2019, Littlemore/Taylor 2014). Language and language acquisition being **usage-based** is the third important aspect of the paradigm shift in grammar teaching (cf. usage-based thesis, Bybee 2008, Langacker 2000, 2009; cf. Chapter 1).

8.2.2 Implementing Cognitive Linguistic Approaches into Grammar Teaching

Despite intensive research in the area of cognitive linguistics, the insights have not yet been taken into account fully in language teaching and learning research today (cf. Littlemore/Low 2006b, Littlemore 2009, Tyler 2008, Niemeier 2019). The area of metaphor research is an exception (for instance Azuma/Littlemore 2010, Beréndi/Csábi/Kövecses 2008, Danesi 2008, Littlemore/Krenmayr/Turner/Turner 2013, MacArthur/ Littlemore 2008, Piquer-Píriz 2008, Skoufaki 2008, Littlemore 2016, 2019). Research papers deal with the role of the metaphoric competence in foreign language acquisition. Littlemore & Low (2006b), for instance, show how communicative competences (grammatical competence, textual competence, illocutionary competence, and sociolinguistic competence, cf. Bachman 1990) function in accordance with metaphoric principles. Therefore, metaphoric competence is central to teaching and learning foreign languages. In light of this, Danesi (2008) shows how L1 and L2 speakers use metaphorical extensions of color differently (see also Roche/Roussy-Parent 2006). He goes on to state that L2 learners are able to use such metaphoric extensions much more frequently and precisely after explicit training than L2 learners in a control group.

Metaphoric competence may be stated as an explicit goal in grammar teaching (Littlemore/Low 2006b, Meex/Mortelmans 2002; also cf. Chapter 2), but to this day, barely any research has dealt with the question of how the processes of metaphorization form a conceptual base for grammar teaching. The few attempts can be categorized into three groups: the first group of research papers are purely cognitive linguistic papers, whose analyses show a potential for language teaching never explicitly covered to date (see, e.g., Bellavia 1996, Smith 2002, Serra Borneto 1996, Arnett 2004, Graumann 2004). A second group focuses on explanatory approaches to language teaching, but does not investigate the aspect of implementing the approach into concrete teaching materials. This particular group of studies also does not conduct any testing (among these are for instance papers by Sylla 1999, Wilmots/Moonen 1997, Freitag/Vandermeeren 2005, Bellavia 2007, Radden/Dirven 2007, Vieira 2011). Finally, the third group studies the use of materials designed on a cognitive linguistic basis, but the studies are not able to demonstrate additional values arising from using metaphors (see the works by Tyler 2008, Reif 2012, Niemeier/Reif 2008, Bielak/Pawlak 2011).

Overall, there are several important gaps in the current body of research. For one, the heterogeneous findings do not identify an explicit additional value of the tested explanatory approaches (cf. Littlemore 2009). Secondly, the question of media adequacy of the developed materials is ignored completely. It might explain why, in many cases, the direct implementation of the cognitive linguistic approaches does not result in the desired additional learning value (Bielak/Pawlak 2011, Reif 2012, Tyler 2008). Thirdly, while the used pedagogical bridges appear conceptually plausible, many learners find them partially inaccessible due to a lack of contextualization. Finally, the few attempts to empirically test cognitive linguistic approaches in the form of concrete materials were all in the area of English as a foreign language (Niemeier 2017, 2019). Exceptions are the studies by Scheller (2009) and Roche & Scheller (2008) on German two-way prepositions, by Kanaplianik (2016) on modal verbs in German, by Suñer (2013, 2015), Arnett (2004) and Bielak, Pawlak & Mystkowska-Wiertelak (2013) on passive, by Compaore (2019) on interactive processes in meaning negotiation, by Gradel (2020) on adjective endings and the article paradigm in German, and by Hoffmann (2018) and Suñer & Roche (2019) on German light verb constructions. As discussed in Chapter 2.3, cognitive linguistic analyses of the use of two-way prepositions in German has shown that item-specific expression of movement/direction (accusative) or non-movement/position (dative) is not the deciding factor in choosing the accusative or dative case. Instead, grammatical case marking is determined by crossing (accusative) or not-crossing (dative) boundaries of a real or imagined target area, distinguishing between expressing a source-path-goal focus versus a focus solely on the goal. The results of the study showed only the combination of cognitive linguistic explanatory approaches and an adequate implementation according to the principles of multimedia learning (Engelkamp/Zimmer 2006, Mayer 2005a, Schnotz 2005) lead to sustainable positive effects in the acquisition of two-way prepositions. A pilot study by Grass (2013) went beyond grammatical features by proving a successful and significant reduction of confusion in learners via a procedure measuring qualitative cognitive changes (cf. Ifenthaler 2010). The study also shows a convergence in the development of mental models.

8.2.3 A Cognitive Approach to Teaching Grammar

A major part of the potential of cognitive linguistic approaches for language teaching lies in the parameters used to describe general cognitive processes, which are highly comprehensible in comparison to other approaches. In this way, every language learner is able to access abstract structures of a L2, independent of his or her linguistic background. At the same time, the cognitive principles presented so far serve as the foundation for integrative, cognitive language teaching. As we have seen, the cognitive approach distinguishes between four different levels: 1) the cognitive linguistics level, 2) the transfer difference level, 3) the grammatical metaphor level, and 4) the (re)presentation and teaching level. Domains, image schemas, and conceptualization processes (Level 1) form the basis of this pedagogical model and have already been presented in detail in Chapter 2.1. We will now take a look at what may be considered the key challenge in language learning and teaching: transfer difference.

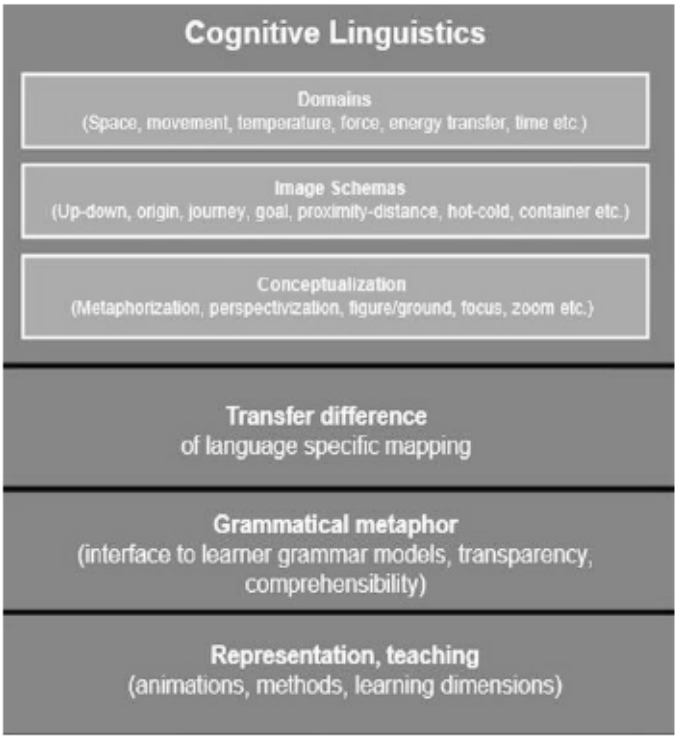


Figure 8.1: Levels of cognitive language teaching

8.2.4 Transfer Difference

Transfer difference is a concept that describes a problem faced by learners – the necessity of constructing meaning in a space between separate linguacultures – as well as the objective from a teaching standpoint of supporting the learner in the effort to build these 'bridges' between initially disparate language contexts. The term is similar to Wilhelm von Humboldt's **Differenzerfahrung** (difference experience; cf. Benner 1995) which is seen as an essential cognitive foundation for learning foreign languages. Successfully learning to reconcile linguacultural differences results in a cognitive state that multilingualism research often refers to as balanced multilingualism. In cultural studies, it is known as **transdifference**. In contrast to contrastive error analyses, transfer difference does not assume static linguistic systems with mainly formal differences. Rather, languages are viewed as dynamic linguacultural systems, which, despite being based on the same cognitive processes and foundations (such as metaphorization, perspectivization, image schemas, etc.), implement these in different ways (cf. Danesi 2008: 234). In that regard, several cognitive linguistic studies were able to prove that language-specific encodings of experiences were not the result of random lexical realizations but, instead, were conceptually motivated and rooted in a socio-cultural context (cf. Danesi 2008, Lakoff/Johnson 1980). Conceptual archetypes (Langacker 2008b) or image schemas (Evans/Green 2006, Johnson 2005) in grammar and lexicon serve as cultural-specific concretizations of cultural content and cultural structure. With that, conceptual archetypes function as triggers for lexical selection (cf. Danesi 2008: 235). An example of such a case is the conceptualization of rain as a container in English and German (*in the rain, im Regen*) and as an entity (e.g., a roof) above us in French, Spanish, Arabic or Russian (*sous la pluie*; cf. Evans/Tyler 2005, as well as Chapter 2.1 on metaphorization). Differences between the conceptual systems of languages also affect the preferred way of encoding experiences in the respective languages, such as encoding a journey or path as motion events (cf. satellite- and verb-framed languages in Talmy 1985; also cf. Özçalışkan/Slobin 1999) or marking or not marking the final point of a scene (cf. von Stutterheim 2003).

In light of this, Danesi (2008) emphasizes how successful language acquisition is not simply knowledge of the formal features of a language and their denotative meaning, but includes a culturally sensitive handling of

metaphorical extensions and the adequate conceptual encoding of experiences (also cf. Danesi 2008, Pavlenko 2009, Roche 2013b, Roche/Roussy-Parent 2006).

We will now use a concrete example in order to study this aspect in greater detail. The example is the expression of modality, i.e., language that is specifically intended to explore different possible situations, in German and Russian. As shown in Chapter 2 and Chapter 7, the category of modality can be characterized as an aspect of the cognitive domain of force dynamics (Johnson 1987, Talmy 2000, Evans/Green 2006, Langacker 1987). Force dynamics code the "naive physics" of our conceptual system, that is, how we intuitively understand forces and their interaction based on our everyday experiences (cf. Johnson 1987: 43, Lampert/Lampert 2000: 240).

Even though force dynamics serve as a universal cognitive foundation for determining the category of modality, its metaphorical categorization and especially its linguistic realization are specific to linguacultural systems (Kanaplianik 2016: 47). The learners must understand how the modal meaning is specifically encoded in the German linguacultural system and how it differs from the conceptualization in their L1 (cf. Kanaplianik 2016: 41). In the case of event modality, the notions of physical forces and their dynamics (source domain of conceptual metaphorization) are transferred to interpersonal relationships (target domain; cf. Sweetser 1990, Talmy 2000, Lakoff/Johnson 1999). The modal relationships are determined by the concepts of implemented and target-oriented forces, barriers, and paths (cf. Kanaplianik 2016: 47–52).

As the modal verbs *should* (German: *sollen*), *must/have to* (German: *müssen*) and *may/be allowed to* (German: *dürfen*) have already been explained in Chapter 2, we will show in the following section how these principles may be used for the German modal verbs *können* (can/be able to) and *wollen* (want/would like to) (for more details, see Kanaplianik 2016: 64–72). The modal verb *können* carries two meanings, similar to the modal verb *can* in English. Its first meaning (possibility; Figure 8.2) is conceptualized as dispersing a barrier, which allows the internal force of the subject to reign free (Talmy 2000: 445). For this reason, *können* (can) is represented as synonymous to *dürfen* (may/be allowed to). The difference between these verbs, however, lies in the source of the force: in the case of *können* (can) it is based on objective circumstances, and in the case of *dürfen* (may/be allowed to) on an external authority (cf. Coates

1983: 93, Dirven/Taylor 1994: 544, Radden 2009: 178, Kanaplianik 2016: 69).

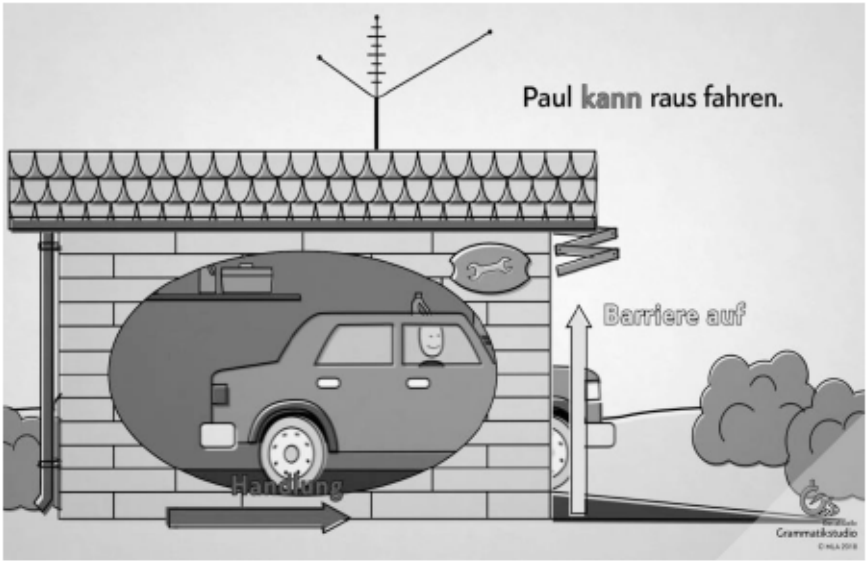


Figure 8.2: The modal properties of the verb *können* (can) described in an illustration (Granima 2018). The labels read: *Paul <u>can</u> exit, action, barrier open*)

In its second meaning (ability, Figure 8.3) the verb *können* (can) evokes an inner force which enables a person to execute an action (Radden/Dirven 2007: 254) (cf. Kanaplianik 2016: 70).

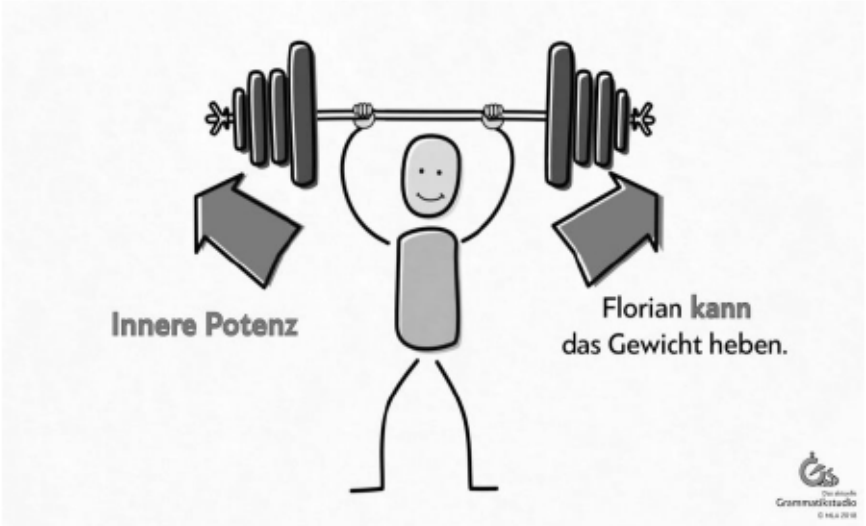


Figure 8.3: The modal properties of the verb *können* (can, ability) described in an illustration (Granima 2018). The labels read: *internal force, Florian <u>can</u> lift the weights)*

The modal verb *wollen* (want to) (Figure 8.4) expresses a strong internal force which encourages a person to execute an action (Talmy 2000: 430). The modal verb *möchten* (would like to) expresses a somewhat weaker force (cf. Kanaplianik 2016: 70).

Figure 8.4: The modal properties of the verb *wollen* (want to) described in an illustration (Granima 2018). The labels read: *Mark wants to/is eager to go skiing*, *strong internal force/motivation*)

The Russian language also expresses the category of modality through modal verbs. This category can also be described by referring to the domain of force dynamics. However, there are notable differences in comparison to the German modality system. Russian does not distinguish between the meanings of must (German: *müssen*) and should (German: *sollen*): the verb *byt' dolzhnym* as well as the construction *nado* (literally: one must or one should/is supposed to), express a force that affects the object from the outside. The attribute of how strong the force is, a concept relevant to German, is not a decisive factor in Russian in this case. The verbs *may* (German: *dürfen*) and *can* (German: *können*) are also not differentiated in Russian and are translated with the single verb *motsch* (open barrier). In this case, the aspect of exterior authority is also irrelevant. The meaning of *may/dürfen* may also be additionally expressed with the paraphrase *imet' razreschenije* (to have permission) as well as the construction

mozhno (one is allowed to, one may, *man darf*). Beyond that, the extent of the meaning of the Russian verb *motsch* (open barrier/inner force) is fundamentally the same as the German verb *können* with respect to its two meanings (possibility and ability). Differentiating between *wollen* and *möchten* is also complicated for Russian L1 speakers: in Russian, a desire is, as a rule, expressed with the verb *hotet'* (interior urge). It is the equivalent of the German *wollen*. Russian does not distinguish the gradients of the intensity of the urge and the aspect of strength of force is also ignored. In summary, it can be said that the paradigm of modal verbs in Russian is less complex and less differentiated than in German, but apart from that, Russian has several other means of expressing modality (cf. Kanaplianik 2016: 232)

In this way, the modality systems of both the Russian and German languages access the domain of force dynamics, despite utilizing it differently. The differences between the conceptual systems of languages are expressed in the usual ways of encoding modal relationships. For this reason, Russian learners of German should be aware of the conceptual differences between German and Russian and orient themselves using the concept of transfer difference instead of simple translations of their L1.

A recent classroom-based study on the teaching and acquisition of grammar in a cognitive context investigated the effectiveness of multimedia animations with respect to the visualization of embodied concepts (Suñer/Roche 2019). The study's focus was on so-called light verb constructions in German which are usually reserved for advanced language classes as they are considered to be difficult to explain to learners (e. g. German *eine Rede halten*, to give a speech). The cognitive linguistic approach used for the description of these constructions draws upon embodied experiences in order to better elucidate the meaningfulness of the respective light verbs as well as the conceptual links between the different types of light verb constructions (Gradečak-Erdeljić 2009). The use of animations was expected to produce an added value for the visualization of relevant embodied concepts, since they too facilitate both the spatial and the temporal integration of dynamic situations as well as the better processing of dynamic aspects of grammar. In more concrete terms, the animations in fact did produce the expected bodily engagement needed for learning the dynamic aspects of the target constructions and lead to the creation of more appropriate mental models. Moreover, learners working with such materials significantly changed their beliefs about grammar

learning, since the importance accorded to the use of image-based explanations after the treatment was considerably higher than for the group working with the traditional approach to teaching grammar by traditional categories and means. The study concludes that the successfulness of concept-based/cognitive approaches supplemented by animations is subject to certain conditions (Suñer/Roche 2019). First, learners should be able to easily relate the movement depicted in the animations to the respective dynamic aspects of the target constructions. This means not only that the approach needs to be well aligned with cognitive linguistic theory using embodied concepts for grammar description, but also that the materials used should ensure that perceptual processing corresponds to the cognitive requirements of mental model construction (Lowe/Schnotz 2014). Second, working with animations also needs to be accompanied by appropriate learning activities that support conceptualization processes and the negotiation of meaning according to socio-cultural theory and concept-based instruction (Vygotskij 1962, Williams/Abraham/Negueruela-Azarola 2013). Finally, it is worth stressing the importance of considering the principles of task-based language teaching (Ellis 2009) when implementing such grammar teaching approaches (cf. the following chapter). Accordingly, grammar should be treated as an essential element for achieving a wide range of communicative purposes, so interventions should aim to foster awareness and deep cognitive processing of the target structures as well as promote their use in a native-like way in relevant communication settings (Niemeier 2017: 75, Tyler 2012).

The acquisition of **conceptual competence** (conceptual fluency; cf. Danesi 2008, metaphoric competence; cf. Littlemore/Low 2006b, pragmatic competence; cf. Kasper 1997, Takahashi 2010, Glaser 2013) is a primary goal of language teaching. It begins with the identification of all kinds of differences between languages in areas relevant to communication, including social behavior. The cognitive processes involved in dissolving this kind of cognitive dissonance and leading to conceptual integration can be operationalized through the generation and modification of mental models and schemas by accommodation and assimilation. The process of a successful integration of conceptual differences is called transdifference, that is, the ability to manage various linguacultural systems in parallel, at ease and with no inhibiting interferences. To be sure, transdifference is not limited to vocabulary or grammar but describes a desired com-

petence level in all areas of communication, including non-verbal communication. Transdifference is a cognitive process best achieved by using language in authentic communication contexts, that is, where learners use the language in action (cf. Roche 2018: 57–76).

8.2.5 Summary

- The initial transfer difference does not present an obstacle for language acquisition, but initiates important processes of conceptual restructuring, central to the acquisition of conceptual competence, metaphoric competence, conceptual fluency, pragmatic competencee (cf. Jessen/Cadierno 2013, De Knop/Dirven 2008, Odlin 2005, Pavlenko 2009, Littlemore/Taylor 2014; also cf. Chapter 3).
- Transdifference as a process of a successful conceptual integration can bridge the distance between the two fields of language teaching and cultural instruction.
- Ideally, learners and speakers are able to separate the conceptual systems of different languages but also use their commonalities productively.
- Metaphoric meanings add transparency to the underlying meaning and are catchy and memorable.
- From this concrete approach, we are able to derive grammatical metaphors that differentiate between languages but also provide a good insight into the grammar of a language due to their vividness and prominence.

8.2.6 Review Questions

1. How do learners proceed when acquiring conceptual or metaphoric competences?
2. What effects does attribute matching produce, e.g., the categorization into source and target domain?
3. What is transfer difference?
4. Summarize the seven levels in cognitive language teaching.
5. How would you explain the category of modality in the German language from a cognitive linguistic perspective?

8.3 Successfully Implementing Grammar and Speech Acts Together

The title of this chapter may seem contradictory to some teachers and learners, but it is nonetheless intentional: bringing language as structure and language as action together provides many possibilities of improving foreign language instruction. Structural properties of a language are often seen as an abstract system of rules and not as a functional instrument for communication. The term speech act is used to represent the functional aspects of language. *How to Do Things with Words* (Austin 1962) is the famous title of a book dealing with exactly these aspects of language. In other words, it refers to the 'doing' part of language. We use the term **Handlung**, borrowed from German, to describe these functions in a more precise way than 'action' (its most common translation) would. Handlung refers to what is happening in the world, or more accurately, what humans and cultural communities perceive of it, attach meaning to, and deem worthy to put into words. Grammar helps us in how we perceive, organize, and verbalise Handlung. We derive all structural properties, but also all socially conditioned language behaviour directly from the use of language during a concrete Handlung. In this chapter, we want to show how task-based language learning, inspired by the concept of Handlung in conjunction with Grammar, can be organically combined with cognitive language pedagogy. We also show that language awareness does not represent a metalinguistic description of abstract characteristics of the language system, but instead a sensitivity for the appropriate use of diverse linguistic structures in specific contexts.

Study Goals

By the end of this chapter, you will:

- recognize how the principle of usage-basedness may be operationalized in a task-based context
- be familiar with the most important elements of action-orientation
- be able to implement these principles successfully.

8.3.1 Applying Usage-Basedness to Language Teaching

As we have already seen, modern theories of cognitive linguistics assume that language is not formed in adherence to abstract rules but develops from language usage. In language learning, **usage-based** alludes to the importance of authentic, varied, and context-rich input which allows learners to construct their knowledge of the language. However, in conventional language teaching, the communication situations offered in class do not always fulfil these requirements because they are presented in an overly instructional fashion and do not leave sufficient room for the learner's own creativity and self-expression. Often, the situations are over-simplified, void of context and feedback, and, therefore, have little in common with any authentic communication exchanges. The crucial challenge for language teachers, then, is this: how can I operationalize the principle of usage-basedness in my classroom?

8.3.2 Principles of Acquiring Linguistic Competences

Task-based language teaching has proven to be highly efficient due to its use of the various pragmatic principles underlying authentic communication. It has also proven itself in professional and academic teaching contexts. All learners learn by doing: by doing things with words (Handlung) and by experimenting. Learners instinctively search for meaning in their environment. Learners scan the entirety of the linguistic input for meaning, compare it to their prior knowledge, and relate it to prior input. They form hypotheses, test them, and sort the processed information by assimilation and accommodation. Natural acquisition principles are sustained by rich communication environments where learners can move forward by learning via chunks and by a step-by-step development of rules (cf. Tomasello 2003, 2006 as well as Handwerker 2002; also cf. Chapter 3). Parallel information can be helpful in such contexts as it accompanies language in a direct and purposeful fashion. Learners can also experience how language can be an efficient tool to advance their own goals. Since the pioneering work of Jean Piaget, it has been well-established that cognition develops from thinking about concrete, non-hypothetical things via the phases of symbolic and pre-terminological thinking to formal thought, including abstract reasoning. In other words, language can only be acquired through forms of concrete experiences with Handlung (cf. Piaget 1976). It is completely normal for errors to occur during this process. Errors are a natural,

inevitable component of developing language skills and even a sign of the individual's learning progress. The more the learner dares to use the language in a varied and complex fashion, the more errors are inevitably made. The lack of a constructive approach to learners' errors could be seen as an essential reason for the lack of success of conventional language courses. Longitudinal studies have shown that 'errors' are not always real or permanent errors, but can instead be seen as markers of the learner's progress. We know from language acquisition research that such 'developmental defects' often disappear on their own over the course of language development if the environment is meaningful, challenging, and supportive – typical characteristics of a task-based learning environment.

The most important principles of language acquisition in a task-based environment can be summarized as follows (cf. Roche/Reher/Simic 2012: 21):

- Humans learn when there are authentic reasons for doing so (**relevance principle**, rich input).
- When words and grammar are embedded into Handlung, learners can learn from the success of their actions (**Handlungsprinzip**, **action principle**).
- Situative language use requires cultural competences (**usage principle**, integration).
- Different situations require different linguistic means (**variety principle**, language awareness).
- Cultural competences are the prerequisite for interpretive and mediation competences (**mediation principle**).
- Concepts are more important than forms (**concept principle**).
- Grammar emerges from language usage and word usage, not the other way around (**lexicality principle**).
- When learners develop the basic variety, acquisition of structures takes place according to criteria of relevance and complexity (**construction principle**).
- Humans learn and retain things that are presented in the foreground (**salience principle**).
- Complex formulas are systematically parsed by learners (**dechunking principle**).

8.3.3 What Successful Teaching Could Look Like

If we apply these principles to language teaching, the following consequences emerge:

- A linearly pre-structured course is not productive for learners because it often does not convey elements necessary for authentic communication and is not oriented toward individual learning progression.
- Lecturing and practicing prefabricated dialogues and language patterns does not promote language growth in learners.
- Doing-oriented learning with speaking opportunities and content/subject matter from the learners' scope of experiences is motivating and effective for language learning (Apeltauer 2004: 97; cf. Roche 2013b).
- The functional use of grammar in practical language application ought to be the focus of teaching. Experimentation and practical use are most important to language growth and are, therefore, central to any successful teaching practice. Additionally, the feedback learners receive for their communicative actions provides crucial information on social acceptability and norms. It can also be motivating.
- Encouragement and motivation for personal and fearless experimentation is, therefore, the most important aspect of teaching.
- Errors are an integral part of learning languages. Reacting to and interacting with the learners appropriately with respect to their linguistic utterances is, therefore, hugely important.
- Expanding the vocabulary base is central to language learning at any time.
- Play-actings are rehearsals and, therefore, very significant. Playful learning, e.g., with serious games, theatre, etc., is an essential way of learning for all ages. It enables communication and practice on a level adequate to the learner. Language-based games with a partner, group, or social games promote language learning in realistic situations.

8.3.4 Language Awareness

Incorporating authentic language that matters to the learner is a fundamental and necessary condition for task-based language acquisition. If we follow basic pragma-linguistic assumptions on a triadic relationship between sender, objects and recipient, we have already identified the necessary pillars of any communicative setting. Communication fulfils three main functions: it is symbol, symptom and signal at the same time (cf. Bühler 1934). The symbol as representation of objects and events is not neutral or objective, but is given as a subjective expression (symptom) of the perspective of a speaker or writer (in short, the sender), who uses it to appeal to the recipient in a certain way (signal). Communication is authentic when all three references are realized. This means that a learner needs to possess knowledge of the relevant content matter and needs to put objects and events into words. Furthermore, depending on the communicative setting, the learner is required to master the respective tasks, e.g., of everyday life (colloquial speech), games (game language), education (academic languages), or professional work (languages for professional or technical purposes, institutional language). In addition, depending on the communicative roles a learner assumes, they need to assess different social positions and the range of social and communicative responsibilities of a sender and a recipient. In other words, a learner needs to be familiar with different conventions and norms and, ideally, they need to know when and how they can violate rules or expand them creatively. This is a matter of language awareness. The possibility of gaining experience in such diverse situations in turn enhances the knowledge of content, issues, and processes, and sensitizes the learner for the appropriate linguistic Handlung involving different dialogue partners and social norms. Language awareness means that a learner has the ability to adjust to naturally occurring linguistic variety. For instance, when a certain task must be articulated with a dialogue partner in professional settings, for example, when speaking to an instructor or another trainee or a customer at the workplace or when making notes in the record book, a particular linguistic form is required. This in turn generates different feedback which itself contributes to a greater variety of linguistic means and finally to an even greater language awareness.

In the previous chapter we have shown that (cross-linguistic and cross-cultural) differences play an important role in gaining language awareness. The term **difference** describes variations in individual perceptions and knowledge constructions as well as distinct subjective attitudes, values,

and expectations of a speaker. Perspectivization not only refers to linguistic or culturally-specific differences but rather to the uniqueness of every individual in terms of prior experiences, knowledge, learning strengths, and weaknesses. The language used in a specific context expresses the uniqueness of that communicative constellation. In the previous chapter, we have also seen that the term difference is distinct from the term transfer difference. Linguacultures express certain conventionalized preferences of perspectives, shared in a certain group, context, and period, but changeable over time. In other words, conventionalized perspectives are habituated and lead to a standardization of expressions, e.g., in colloquial expressions, names, metaphors and, as we have seen, in grammar.

Experiment 1

Have you ever thought about why English speakers *live ON a street* or *travel ON a bus or plane* while in other linguacultures they *live IN a street* and *travel IN a bus or plane*?

(Solution: English likes to use the image schema of a platform or surface in order to conceptualize streets or vehicles (*on a street*, *on a bus*), while other languages use different schemas such as containers (Germ.: *in der Straße*, *im Bus*, French: *dans la rue*).

All speakers move within conventionalized frames, even though they, of course, have the freedom to develop different perspectives. We refer to the systemic difference between linguacultures by the term transfer difference: learners are charged with mediating between linguacultures in language acquisition. One could say that transdifference refers to the ultimate goal in a learner's language competence while transfer difference refers to the learner's task to manage inter-individual concepts of linguacultures.

8.3.5 Operationalizing the Principle of the Full-Task-Cycle

In reference to the concept of task-based language learning, scenario teaching basically means to create communicative constellations which are capable of relating to the students' interests in terms of content and in terms

of communicative tasks. Learners may assume different roles in role-playing games, scenarios, case studies, and games. Furthermore, if teaching is more effective than learning, then leaners should of course also assume teaching roles themselves. The following elements are crucial for making scenario teaching a success:

- a setting with an explicit, integrated goal of simultaneously enhancing language and method competences as well as knowledge or skills within a real-life specialized field
- paying attention to progression (advancing through different learning fields in the subject curriculum)
- incorporating original Handlungsituations, including real content and tasks (case-based learning, real-life scenarios)
- systematic planning of processes in the form of incremental tasks corresponding to operational processes and other everyday processes (with active participation of the learners)
- providing aids for independent study and research
- using authentic and appealing visualizations
- using multimediality adequately (appropriate in terms of the communicative situation) to address all abilities (without hyping up an otherwise irrelevant form of media for its own sake)
- no pseudo-task-based exercises (such as partner dictations, choir speaking, copying, etc., except if they are communicatively justified in terms of linguistic pragmatics)
- no purely form-based but rather objective-oriented grammar and orthography exercises embedded in authentic tasks.

A sensitive learner will always pick up on linguistic means or even choose to research them and inquire when they are sensibly and effectively incorporated into a communicative purpose. The insights into the regularities and structures of a language, gained through actual linguistic Handlung, support language growth and foster language awareness. Language growth is always a creative process of the individual learner. It can be fostered by interest and encouragement from the learning environment.

If you want to employ the theoretical foundations and principles of task-based learning in language teaching, the principle of the full-task-cycle can serve as a good and easy-to-implement point of reference. This principle is

suitable for developing a curriculum and for planning and structuring lessons. It encompasses the following steps, and these in turn may be formulated as incremental tasks:

Figure 8.5: Overview of the principles of the full-task-cycle (Roche/Terrasi-Haufe 2016: 29)

Orientation	The prior knowledge of the learners is activated. What is there to do? What do we already know? Where can we find additional information?
Information	The learners gather information based on various materials pertaining to the specific task and content.
Planning and Analyzing	There are always multiple solutions and solution paths regarding a matter or task. What could we do? Who has done a similar task before? Who is best at it? Tasks must be determined and distributed, and a work routine must be planned. Aids must be chosen, relevant templates analyzed.
Practice Run	This phase includes working on the product itself and encompasses several acts of choosing, decision making and working as well as practice runs.
Presentation	The preparation phases are followed by the presentation of the project. Everything is carefully checked and rehearsed beforehand. Everyone is proud of their accomplishments, after all.
Evaluation/ Reflection	Based on mutually established criteria, the worked-out products are evaluated constructively. The phase of conclusive reflection marks the end of the scenario: What has been successful? What could be used in other situations? What would be done differently?

Table 8.1: Principles of the full-task cycle in class (Roche/Terrasi-Haufe 2016: 29)

The extent and difficulty of the respective scenarios and tasks depends on the requirements and goals of the communicative situation. Phases such as evaluation and reflection may also be combined if useful in a certain scenario. These may be differentiated with respect to the level of difficulty: students can either work in an open, more challenging environment towards different linguistic products, or those who need more assistance can

be offered a comprehensive supply of aids and tools, such as scaffolding, simplified texts, and more guidance. During the evaluation and reflection phase learners and instructors determine how the tasks could be conducted in different ways, which components work well or need improvement. Let us look at an example suitable for the A2 level:

Task/Phase	To dos	Materials	Comments
Task at hand	Find accommodation abroad for your study exchange or vacation in an area you want to visit and in a housing arrangement that suits your needs		
Orientation	Make a plan on how to handle the task. What resources/knowledge do you possess? Who has useful experiences/talents? Where can we find additional information?	E.g., get information on the region/area/ town in question using WWW-resources or information materials, media: associogramms, notes, websites, broschure …	
Information	Check resources and collect information based on various materials pertaining to the specific task and content. Conduct interviews if necessary. E.g. check housing offers on various websites such as Mr. Lodge, Flipkey, Wimdu, HomeAway, Air B&B. Discuss alternatives, compare offers …	websites, literature, interviews with resource persons such as friends, teachers, pen pals …	Mrlodge, Airbnb[2]

[2] https://www.mrlodge.de/ (September 2022), https://www.airbnb.de/ (September 2022).

Planning and Analyzing	There are always multiple solutions and solution paths regarding a matter or task. Sort and organize what you found. Determine sub-tasks for everyone in the group according to interests, talents, and strengths. Plan a work routine and chose/prepare the instruments/media etc. E.g. prepare a telephone call to the potential landlord, fill out an application online, write a letter. Check appropriate linguistic means: e.g. how is a telephone call to a landlord/agency usually structured? How is an application written in the foreign language? What are appropriate linguistic means such as the right tense, form of address etc.?	lists, scaffolds, scripts, computers, phones, pictures, reference grammars/ model texts, instructor as resource person …	
Practice Run	See how far you get with your preparation. Practice and find additional information and materials if necessary. Decide on improvement strategies.	authentic materials, recordings	
Presentation	The preparation phases are followed by the presentation of the project, e.g. assume various roles in the scenario, such as land lord/agent, customer/interested student, family member/	authentic materials and instruments	

	friend disagreeing with the choice of offers, write a report for the school's website (and publish it of possible).		
Evaluation/ Reflection	When the scenario is played out in class the students not involved in your scenario may act as consultants to a landlord/agency, be involved in deciding where to go and whether you can afford the price, or as "independent judges", e.g. they may decide whether the landlord/agency will rent the place to you, or they may judge in other sensible ways whether the communication was successful or could be improved in certain aspects.	assessment charts, notes	

Table 8.2: Example for the implementation of the principles of the full-task-cycle in an A2 level class (translated from Roche/Terrasi-Haufe 2016)

Much of the planning and task execution can be done by the learners. After all, they are the ones who are supposed to be learning by actively doing things with words. Learners who are not used to independent forms of study will need subtle assistance in getting there. The instructors act as coaches. They monitor the learning and studying process, assist where necessary, and act as resources themselves for providing information. In a cognitive approach to language teaching and learning, their primary task is to foster cognitive processes, i.e., learning processes of their students. Being able to explain the cognitive foundations and applications of languages, including grammar, is one of the most demanding, most important, and most rewarding jobs of teachers.

Experiment 2

Can you think of a scenario for your class? Pick a topic or sequence for a class and create authentic scenarios following the principles listed above.

By using carefully targeted scenarios, tasks, and games, the teacher can address the integration of grammatical structures in every language activity during a learning scenario. This grammar, as shown in the context of cognitive grammar and grammar animations before, does not have to appear in an abstract form but results from the perception, representation, and construction of the world. In other words, it has meaning. Despite this fact, a Handlung which is accompanied by language is especially effective for learning languages. Ideally, beginning language learners work together with advanced learners. Alternatively, more advanced learners can be assigned co-teaching roles. There are many more advantages to scenario-based language teaching, including the integration of modern digital media as resources, using exciting cross-subject content, including the various talents of learners in different roles and according to ability, using various oral and writing skills in combination as in authentic language use. Acquiring a foreign language can indeed be as easy as acquiring a first language. It requires a genuine interest, an open and flexible mind, challenging but manageable input in authentic and relevant tasks and a supportive environment.

8.3.6 Summary

- Grammar is a communication tool aiding in the organization of the objects we perceive and wish to put into words.
- Grammar is directly derived from actions or the use of language in a concrete Handlungsituation. Therefore, in cognition-based teaching, the focus is on the use of the appropriate linguistic structures in a certain context, not on the metalinguistic description of these structures.
- Doing-oriented teaching is based on relevance, lexicality, salience, situativity, actions, practicality, mediation, and language development.

- Errors are not a sign of failure but must instead be interpreted and analyzed as indications of progress in acquisition.
- The foundation of language acquisition is linguistic action. A Handlung is only complete when the aspects of authentic communication (according to Bühler 1934) are realized.
- Authentic learning environments can be created through task-based learning scenarios.
- When dealing with authentic communicative situations in language teaching, the following steps must be taken into account: orientation, information, planning and analysis, execution, presentation, evaluation and reflection.

8.3.7 Review Questions

1. Name and explain the most important principles of task-based language acquisition.
2. Name the most important principles of good teaching.
3. Which elements are crucial for task-based teaching?
4. Describe the phases of the full-task-cycle.

References

Achard, M. (2008). Teaching construal: Cognitive pedagogical grammar. In Robinson, P./Ellis, N. (Eds.), *Handbook of Cognitive Linguistics and Second Language Acquisition*. New York: Routledge, 432–455.

Adamzik, K. (2001). *Kontrastive Textologie. Untersuchungen zur deutschen und französischen Sprach- und Literaturwissenschaft*. Tübingen: Stauffenburg.

Adesope, O./Nesbit, J. (2012). Verbal redundancy in multimedia learning environments: meta-analysis. *Journal of Educational Psychology* 104: 1, 250–263.

Aitchison, J. (1997). *Wörter im Kopf. Eine Einführung in das mentale Lexikon*. Tübingen: Niemeyer.

Albrecht, J. (2007). *Europäischer Strukturalismus. Ein forschungsgeschichtlicher Überblick*, 3. Erweiterte Auflage. Tübingen: Narr.

Allen, R. J./Hitch, G. J./Baddeley, A. D. (2009). Cross-modal binding and working memory. *Visual Cognition* 17: 1–2, 83–102.

Allen, S. (2003). An analytic comparison of three models of reading strategy instruction. *International Review of Applied Linguistics in Language Teaching* 41: 4, 319–338.

Altmann, G./Steedman, M. (1988). Interaction with context during human sentence processing. *Cognition* 30, 191–238.

Amadieu, F./Tricot, A./Mariné, C. (2009). Prior knowledge in learning from a non-linear electronic document: Disorientation and coherence of the reading sequences. *Computers in Human Behavior* 25, 381–388.

Ameka, F. K./Levinson, S. C. (2007). The typology and semantics of locative predicates: Posturals, positionals and other beasts. *Linguistics* 45: 5–6, 847–871.

Anderson, N. J. (2005). L2 learning strategies. In: Hinkel, E. (Ed.), *Handbook of Research in Second Language Teaching and Learning*. Mahwah, NJ: Erlbaum Associates, 757–772.

Andrä, C./Mathias, B./Schwager, A./Macedonia, M./von Kriegstein, K. (2020). Learning Foreign Language. Vocabulary with Gestures and Pictures Enhances Vocabulary Memory for Several Months Post-Learning in Eight-Year-Old School Children. *Educational Psychology Review* 32, 815–850.

Andrews, S./Miller, B./Rayner, K. (2004). Eye movements and morphological segmentation of compound words: There is a mouse in mousetrap. *European Journal of Cognitive Psychology* 16: 2, 285–311.

Antonenko, P./Niederhauser, D. (2010). The influence of leads on cognitive load and learning in a hypertext-assisted learning environment. *Computers in Human Behavior* 26: 2, 140–150.

Antonietti, A./Cancer, A./Colombo, B./Iannello, P. (2021). Metacognitive Experience Across the Creative Process. In: Moraitou, D./Metallidou, P. (Eds), *Trends and Prospects in Metacognition Research across the Life Span a Tribute to Anastasia Efklides*. Switzerland: Springer Nature Switzerland AG, 59–79.

Apeltauer, E. (2004). *Sprachliche Frühförderung von zweisprachig aufwachsenden türkischen Kindern im Vorschulbereich. Zwischenbericht über die Kieler Modellgruppe (März 2003 bis April 2004)*. Flensburg: Univ. Flensburg, Abt. Deutsch als Fremde Sprache.

Arnett, C. (2004). *A Cognitive Approach to the Semantics of the German Passive*. New York: Edwin Mellen Press.

Arnett, C./Suñer, F. (2019). Leveraging cognitive linguistic approaches to grammar teaching with multimedia animations. *Journal of Cognitive Science* 20: 3, 365–399.

Arnett, C./Suñer, F./Pust, D. (2019). *Using Cooperation Scripts and Animations to Teach Grammar in the Foreign Language Classroom*. Yearbook of the German Cognitive Linguistics Association 7: 1, 31–50.

Artelt, C. (2000). *Strategisches Lernen*. Reihe: Pädagogische Psychologie und Entwicklungspsychologie, Bd. 18. Münster: Waxmann.

Astleitner, C. (1997). Effects of External Learning Aids on Learning with Ill-Structured Hypertext. Journal of Educational Computing Research 17: 1, 1–18.

Athanasopoulos, P. (2009). Cognitive representation of colour in bilinguals: The case of Greek blues. *Bilingualism: Language and Cognition* 12: 1, 83–95.

Atkinson, R. C./Shiffrin, R. M. (1968). Human memory: A proposed system and its control processes. In: Spence, K. W./Spence T. J. (Eds.), *The Psychology of Learning and Motivation: Advances in Research and Theory*. New York: Academic Press, 89–195.

Austin, J. L. (1962). *How To Do Things With Words*. Oxford: Clarendon University Press.

Ayres, P./Sweller, J. (2014). The split-attention principle in multimedia learning. In: Mayer, R. E. (Ed.), *The Cambridge Handbook of Multimedia Learning*. Cambridge: Cambridge University Press, 206–226.

Ayres, P. (2012). Worked example effect. In: Seel, N. M. (Ed.), *Encyclopedia of the Sciences of Learning*. Berlin: Springer, 3467–3471.

Azuma, M./Littlemore, J. (2010). Promoting creativity in English language classrooms. *JACET Kansai Journal* 12, 8–19.

Azuma, M. (2009). Positive and negative effects of mother-tongue knowledge on the interpretation of figurative expressions. *Papers in Linguistic Science* 15, 165–192.

Bachman, L. F. (1990). *Fundamental Considerations in Language Testing*. Oxford: Oxford University Press.

Baddeley, A. D. (1986). *Working Memory*. Oxford: Oxford University Press.

Baddeley, A. D. (2000). The episodic buffer: A new component of working memory? Trends in Cognitive Sciences 4, 417–423.

Baddeley, A. D. (2003). Working memory. Looking back and looking forward. *Nature Reviews. Neuroscience* 4, 829–839.

Baddeley, A. D./Gathercole, S. E./Papagno, C. (1998). The phonological loop as a language learning device. *Psychological Review* 105: 1, 158–173.

Badecker, W./Miozzo, M./Zanuttini, R. (1995). The two-stage model of lexical retrieval: Evidence from a case of anomia with selective preservation of grammatical gender. *Cognition* 30: 3, 193–216.

Ballstaedt, S.-P./Mandl, H./Schnotz, W./Tergan, S.-O. (1981). *Texte verstehen, Texte gestalten*. München: Urban & Schwarzenberg.

Bannert, M. (2003). Effekte metakognitiver Lernhilfen auf den Wissenserwerb in vernetzten Lernumgebungen. *Zeitschrift für pädagogische Psychologie* 17: 1, 13–25.

Bannert, M. (2005). Designing metacognitive support for hypermedia learning. In: Okamoto, T./D. Albert, T. Honda/F. W. Hesse (Eds.), *The 2nd Joint Workshop of Cognition and Learning through Media-Communication for Advanced E-Learning*. Tokyo, Japan: Sophia University, 11–16.

Bannert, M. (2006). Effects of reflection prompts when learning with hypermedia. *Journal of Educational Computing Research* 35: 4, 359–375.

Bannert, M. (2007). *Metakognition beim Lernen mit Hypermedien: Erfassung, Beschreibung und Vermittlung wirksamer metakognitiver Strategien und Regulationsaktivitäten*. Münster: Waxmann.

Bannert, M./Mengelkamp, C. (2013). Scaffolding Hypermedia Learning Through Metacognitive Prompts. In: Azevedo, R./Aleven, V. (Eds.), *International Handbook of Metacognition and Learning Technologies*. New York: Springer, 171–186.

Bannert, M./Sonnenberg, C./Mengelkamp, C./Pieger, E. (2015). Short- and long-term effects of students' self-directed metacognitive prompts on navigation behavior and learning performance. *Computers in Human Behavior*, 52, 293–306.

Barcelona, A./Valenzuela, J. (2011). An overview of cognitive linguistics. In: Brdar, M./Gries, S. T./Fuchs, M. (Eds.), *Cognitive Linguistics: Convergence and Expansion*. Amsterdam: John Benjamins, 17–46.

Bates, E./Dale, P. S./Thal, D. (1995). Individual differences and their implications for theories of language development. In: Fletcher, P./MacWhinney, B. (Eds.), *Handbook of Child Language*. Oxford: Basil Blackwell, 96–151.

Becker, T./Peschel, C. (2013). Zum Zusammenhang von morphologischem Wissen und orthographischen Kompetenzen bei Kindern mit Deutsch als Zweitsprache. In: Decker-Ernst, Y./Oomen-Welke, I. (Eds.), *Deutsch als Zweitsprache. Beiträge zur durchgängigen Sprachbildung*. Freiburg: Fillibach, 193–209.

Becker, T. (2011). Der Orthographieerwerb deutscher und deutsch-türkischer Kinder im Vergleich. In: Valtin, R./Homberg, S. (Eds.), *Mehrsprachigkeit. Chance oder Hürde beim Schriftspracherwerb. Empirische Befunde und Beispiele guter Praxis*. Berlin: DGLS, 137–151.

Behrens, H. (2009). Konstruktionen im Spracherwerb. *Zeitschrift für Germanistische Linguistik* 37: 3, 427–444.

Bellavia, E. (1996). The German über. In: Pütz, M./Dirven, R. (Eds.), *The Construal of Space in Language and Thought*. Berlin: de Gruyter, 73–107.

Bellavia, E. (2007). *Erfahrung, Imagination und Sprache. Die Bedeutung der Metaphern der Alltagssprache für das Fremdsprachenlernen am Beispiel der deutschen Präpositionen*. Tübingen: Narr.

Benner, D. (1995). *Wilhelm von Humboldts Bildungstheorie: Eine problemgeschichtliche Studie zum Begründungszusammenhang neuzeitlicher Bildungsreform* (2. korr. Aufl.). Weinheim, München: Juventa-Verlag.

Bensoussan, M. (1998). Schema effects in EFL reading comprehension. *Journal of Research in Reading* 21: 3, 213–227.

Berardi-Coletta, B./Buyer, L. S./Dominowski, R. L./Rellinger, E. R. (1995). Metacognition and problem solving: A process-oriented approach. *Journal of Experimental Psychology Learning Memory and Cognition* 21: 1, 205–223.

Beréndi, M./Csábi, S./Kövecses, Z. (2008). Using conceptual metaphors and metonymies in vocabulary teaching. In: Boers, F./Lindstromberg, S. (Eds.), *Cognitive Linguistic Approaches to Teaching Vocabulary and Phraseology*. Amsterdam: Mouton de Gruyter, 65–100.

Bergen, B. K./Chang, N. (2005). Embodies construction grammar in simulation-based language understanding. In: Östman, J.-O./Fried, J. (Eds.), *Construction Grammar(s): Cognitive and Cross-Language Dimensions*. Amsterdam/Philadelphia: Johns Benjamins, 147–190.

Berk, E./Devlin, J. (1991). What is Hypertext? In: Berk, E./Devlin, J. (Eds.), *Hypertext/Hypermedia Handbook*. New York: Intertext Publications McGraw-Hill, 3–7.

Berthele, R. (2004). The typology of motion and posture verbs: A variationist account. In: Kortmann, B. (Ed.), *Dialectology Meets Typology. Dialect Grammar from a Cross-Linguistic Perspective*. Berlin/New York: Mouton de Gruyter, 93–126.

Berthele, R. (2012). On the use of 'put' verbs by multilingual speakers of Romansh. In: Kopecka, A./Narasimhan, B. (Eds.), *Events of »Putting« and »Taking«: A Crosslinguistic Perspective*. Amsterdam: John Benjamins, 145–166.

Betrancourt, M. (2005). The animation and interactivity principles in multimedia learning. In: Mayer, R. E. (Ed.), *The Cambridge Handbook of Multimedia Learning* (2nd ed.). Cambridge: Cambridge University Press, 287–296.

Bezdan, E./Kester, L./Kirschner, P. A. (2013). The influence of nodes sequence and extraneous load induced by graphical overviews on hypertext learning. *Computers in Human Behavior* 29, 870–880.

Bielak, J./Pawlak, M. (2011). Teaching English tense and aspect with the help of cognitive grammar: An empirical study. *Studies in Second Language Learning and Teaching* 1: 3, 365–400.

Bielak, J./Pawlak, M./Mystkowska-Wiertelak. A. (2013). Teaching the English active and passive voice with the help of cognitive grammar: An empirical study. *Studies in Second Language Learning and Teaching* 3: 4. 581–619.

Birdsell, B. (2019). Exploring Cognition in CLIL: Creativity, Metaphors and Economics. In: Exploring Cognition in CLIL: *Creativity, Metaphors and Economics*. Yokohama: J-CLIL

Blomberg, J., Jessen, M./Roche, J. (2018). Subject: Linguistics, Morphology and Syntax. In: Kognitive Linguistik. Tübingen: *Narr Francke* Attempto.

Boas, F. (1911). *Handbook of American Indian Languages*. Washington: G. P. O.

Boekaerts, M. (1997). Self-regulated learning. A new concept embraced by researchers, policy makers, educators, teachers, and students. *Learning and Instruction* 7: 2, 161–186.

Boland, J. E. (1997). The relationship between syntactic and semantic processes in sentence comprehension. *Language and cognitive Processes* 12, 423–484.

Borkowski, J. G./Thorpe, P. K. (1994). Self-regulation and motivation: A life-span perspective on underachievment. In: Schunk, D. H./Zimmermann, B. J. (Eds.), *Self-Regualtion of Learning and Performance*. Hillsdale: Lawrence Erlbaum Associates, 45–73.

Borkowski, J. G. (1996). Metacognition: Theory or chapter heading? *Learning and Individual Differences* 8: 4, 391–402.

Bot de, K. (2010). Cognitive processing in bilinguals: From static to dynamic models. In: Kaplan, R. B. (Ed.), *Oxford Handbook of Applied Linguistics*. Oxford/New York: Oxford University Press, 335–348.

Bot de, K. /Lowie, W./Verspoor, M. (2005). *Second Language Acquisition. An Advanced Resource Book*. New York: Routlegde.

Boulenger, V./Hauk, O./Pulvermüller, F. (2009). Grasping ideas with the motor system: Semantic somatotopy in idiom comprehension. *Cerebral Cortex* 19: 8, 1905–1914.

Bowdle, B. F./Gentner D. (2005). The career of metaphor. *Psychological Review* 112, 193–216.

Bowerman, M./Gullberg, M./Majid, A./Narasimhan, B. (2004). Put project: The cross-linguistic encoding of placement events. In: Majid, A. (Ed.), *Field Manual* Volume 9, 10–24. Nijmegen: Max Planck Institute for Psycholinguistics.

Brinker, K. (1971). *Das Passiv im heutigen Deutsch. Form und Funktion*. München: Hueber.

Brinker, K. (2010). *Linguistische Textanalyse. Eine Einführung in Grundbegriffe und Methoden*. Berlin: Schmidt.

Britt, M. A./Rouet, J.-F./Perfetti, C. A. (1996). Using hypertext to study and reason about historical evidence. In: Rouet, J.-F./Levonen, J. J./Dillon, A./Spiro, Rand J. (Eds.), *Hypertext and Cognition*. Mahwah, NJ: Lawrence Erlbaum, 43–72.

Broadbent, D. E. (1958). *Perception and Communication*. London: Pergamon Press.

Broek, P. van den/Lorch, R. F./Linderholm, T./Gustafson, M. (2001). The effects of readers' goals on inference generation and memory for texts. *Memory and Cognition* 29: 8, 1081–1087.

Broek, P. van den/Risden, K./Husebeye-Hartmann, E. (1995). The role of readers' standards for coherence in the generation of inferences during reading. In: Lorch, R. F./O'Brien, E. J. (Eds.), *Sources of Coherence in Reading*. Hillsdale, N.J: L. Erlbaum Associates 353–374.

Broek, P. van den/Young, M./Tzeng, Y./Linderholm, T. (1999). The landscape model of reading: Inferences and the online construction of memory representation. In: van Oostendorp, H./Goldman, S. R. (Eds.), *The Construction of Mental Representations During Reading*. Mahwah: Lawrence Erlbaum, 71–98.

Brown, A. L./Day, J. D. (1983). Macro-rules for summarizing texts: The development of expertise. *Journal of Verbal Learning and Verbal Behavior* 22: 1, 1–14.

Brown, A. L. (1978). Knowing when, where, and how to remember: A problem of metacognition. In: Glaser, R. (Ed.), *Advances in instructional psychology*. Hillsdale, NJ: Erlbaum, 77–165.

Brown, A. L. (1978): Knowing when, where, and how to remember: A problem of metacognition. In: Glaser, R. (Ed.), *Advances in Instructional Psychology*, Vol. 1. Hillsdale, NJ: Lawrence Erlbaum Associates, 77–265.

Brown, A. L./Campione, J. C./Day, J. D. (1981). Learning to learn: On training students to learn from texts. *Educational Researcher* 10: 2, 14–21.

Brown, A. S. (2012). *Tip of the Tongue State*. Hove, U. K.: Psychology Press.

Brünken, R./Plass, J. L./Leutner, D. (2004). Assessment of cognitive load in multimedia learning with dual-task methodology: Auditory load and modality effects. *Instructional Science* 32, 115–132.

Brünken, R./Seufert, T./Zander, S. (2005). Förderung der Kohärenzbildung beim Lernen mit multiplen Repräsentationen. *Zeitschrift für pädagogische Psychologie* 19: 1/2, 61–75.

Brunstein, A./Krems, J. F. (2005). Einfluss des Bearbeitungsziels auf die Strategiewahl beim hypertextgestützten Lernen. *Zeitschrift für pädagogische Psychologie* 19: 1/2, 39–48.

Bühler, K. (1934). *Sprachtheorie. Die Darstellungsfunktion der Sprache*. Jena: Fischer.

Bush, V. (1945). As we may think. *The Atlantic Monthly* 176: 1, 101–108.

Bybee, J. (2008). Usage-based grammar and second language acquisition. In: Robinson, P./Ellis, N. (Eds.), *Handbook of Cognitive Linguistics and Second Language Acquisition*. New York: Routledge, 216–236.

Calisir, F./Gurel, Z. (2003). Influence of text structure and prior knowledge of the learner on reading comprehension, browsing and perceived control. *Computers in Human Behavior* 19, 135–145.

Calisir, F./Eryazici, M./Lehto, M. R. (2008). The effects of text structure and prior knowledge of the learner on computer-based learning. *Computers in Human Behavior* 24: 2, 439–450.

Calvi, L./Bra de, P. (1997). Proficiency-adapted information browsing and filtering in hypermedia educational sytsems. *User Modeling and User-Adapted Interaction* 7: 4, 257–277.

Cangöz, B./Altun, A. (2012). The effects of hypertext structure, presentation and instruction types on perceived disorientation and recall performances. *Contemporary Educational Technology* 3: 2, 81–89.

Carlisle, J. F./Katz, L. A. (2006). Effects of word and morpheme familiarity on reading of derived words. *Reading and Writing* 19, 669–693.

Carpenter, P. A./Miyake, A./Just, M. A. (1995). Language comprehension: Sentence and discourse processing. *Annual Review of Psychology* 46, 91–120.

Carstensen, K.-U. (2000). Räumliche Mikroperspektivierung und die Semantik lokaler Präpositionen. In: Habel, C./Stutterheim, C. von (Eds.), *Räumliche Konzepte und sprachliche Strukturen*. Tübingen: Niemeyer, 237–260.

Cerpa, N./Chandler, P./Sweller, J. (1996). Some conditions under which integrated computer-based training software can facilitate learning. *Journal of Educational Computing Research* 15: 4, 345–367.

Chamot, A. U./O'Malley, J. M. (1994). The CALLA handbook: Implementing the cognitive academic language learning approach. Reading, Mass: Addison-Wesley Pub. Co.

Chamot, A. U. (2005). Language learning strategy instruction. Current issues and research. *Annual Review of Applied Linguistics* 25, 112–130

Chamot, A. U./Barnhardt, Sarah/El-Dinary, P. B./Robbins, J. (1999). *The Learning Strategies Handbook*. White Plains, NY: Longman.

Chandler, P./Sweller, J. (1996). Cognitive load while learning to use a computer program. *Applied Cognitive Psychology* 10: 2, 151–170.

Charteris-Black, J. (2002). Second language figurative proficiency: A comparative study of Malay and English. *Applied Linguistics* 23: 1, 104–133.

Chee, M./Tan, E./Thiel, T. (1999). Mandarin and English single word processing studies with functional magnetic resonance imaging. *Journal of Neuroscience* 19, 3050–3056.

Chen, C./Rada, R. (1996). Interacting with hypertext: A meta-analysis of experimental studies. *Human-Computer Interaction* 11, 125–156.

Chen, Y./Huei-ling, L. (2013). The influence of cultural universality and specificity on EFL learners' comprehension of metaphor and metonymy. *International Journal of Applied Linguistics* 23, 312–336.

Cheung, H./Chen, H. (2004). Early orthographic experience modifies both phonological awareness and on-line speech processing. *Language and Cognitive Processes* 19: 1, 1–28.

Chi, M. T. H./De Leeuw, N./Chiu, M./Lavancher, C. (1994). Eliciting self-explanations improves understanding. *Cognitive Science* 18, 439–477.

Chiarcos, C. (2011). The mental salience framework: Context-adequate generation of referring expressions. In: Chiarcos, C./Berry, C./Grabski, M. (Eds.), *Salience. Multidisciplinary Perspectives on its Function in Discourse*. Berlin/New York: de Gruyter, 105–140.

Chomsky, N. (1959). Verbal Behavior by B. F. Skinner. *Language* 35: 1, 26–58.

Chomsky, N. (1965). *Aspects of the Theory of Syntax*. Cambridge: MIT Press.

Christmann, U./Groeben, N. (1999). Psychologie des Lesens. In: Franzmann, B./Hasemann, K./Löffler, D./Schön, E. (Eds.), *Handbuch Lesen*. München: K. G. Saur Verlag, 148–178.

Clark, R./Mayer, R. E. (2016). *e-Learning and the Science of Instruction*. San Francisco: Pfeiffer.

Clausner, T./Croft, W. (1999). Domains and image schemas. *Cognitive Linguistics* 10: 1, 1–31.

Coates, J. (1983): *The Semantics of the Modal Auxiliaries*. London: Croom Helm.

Cock de, B./Suñer, F. (2018) (im Druck). The influence of conceptual differences on processing taboo metaphors in a foreign language. In: Pizarro, A. (Ed.), *Linguistic Taboo Revisited. Novel Insights from Cognitive Perspectives. Cognitive Linguistics Research*. Berlin et al.: De Gruyter.

Cohen, A. D. (1999). *Strategies in Learning and Using a Second Language. Applied Linguistics and Language Study*. London: Longman.

Cohen, A. D. (2011). *Strategies in Learning and Using a Second Language*. 2nd Edition. London: Routledge.

Coltheart, M./Rastle, K./Perry, C./Langdon, R./Ziegler, J.s (2001). DRC: a dual route cascaded model of visual word recognition and reading aloud. *Psychological Review* 108: 1, 204–256.

Compaoré, C. (2018). *Evaluation kollaborativer eLern- und Lehrprozesse. Instruktionsdesign zum Einsatz kognitionsbasierter Grammatikanimationen in virtuellen Klassen*. Berlin/Münster: Lit Verlag.

Compaoré, C. (2019). Design und Einsatz von Kollaborationsskripts als instruktionale Unterstützungsmaßnahme in virtuellen Klassen. Am Beispiel der Grammatikvermittlung. In Hafer, J./Mauch, M./Schumann. M. (Eds.), *Teilhabe in einer digitalen Bildungswelt* Münster: Waxmann, 128–137.

Conklin, J. (1987). Hypertext: A survey and introduction. *IEEE Computer* 20: 9, 17–41.

Corder, S. P. (1967). The significance of learners' errors. *International Review of Applied Linguistics* 5, 160–170.

Costa, A./Kovacic, D./Franck, J./Caramazza, A. (2003). On the autonomy of the grammatical gender systems of the two languages of a bilingual. *Bilingualism: Language and Cognition* 6, 181–200.

Council of Europe (2001). Common European Framework of Reference for Languages: Learning, teaching, assessment. Strasbourg: *Modern Languages Division*. Cambridge University.

Craig, S. D./Gholson, B./Driscoll, D. M. (2002). Animated pedagogical agents in multimedia educational environments: effects of agent properties, picture features, and redundancy. *Journal of Educational Psychology* 94: 2, 428–434.

Croft, W. (2001). *Radical Construction Grammar: Syntactic Theory in Typological Perspective*. Oxford: Oxford University Press.

Cuddihy, E./Spyridakis, J. H. (2012). The effect of visual design and placement of intraarticle navigation schemes on reading comprehension and website user perceptions. *Computers in Human Behavior* 28: 4, 1399–1409.

Cutler, A./Butterfield, S. (1992). Rhythmic cues to speech segmentation: Evidence from juncture misperception. *Journal of Memory & Language* 31, 218–236.

Cutler, A./Norris, D. (1988). The role of strong syllables in segmentation for lexical access. *Journal of Experimental Psychology: Human Perception & Performance* 14, 113–121.

Cuyckens, H./Radden, G. (2002). *Perspectives on Prepositions*. Tübingen: Niemeyer.

Danesi, M. (2003). *Second Language Teaching. A View from the Right Side of the Brain*. Boston: Kluwer Academic.

Danesi, M. (2008). Conceptual errors in second-language learning. In: De Knop, S./De Rycker, T. (Eds.), *Cognitive Approaches to Pedagogical Grammar*. Berlin/New York: De Gruyter, 231–256.

Davis, E. A./Linn, M. C. (2000). Scaffolding students' knowledge integration: Prompts for reflection in KIE. *International Journal of Science Education* 22: 8, 819–837.

De Knop, S./Dirven, R. (2008). Motion and location events in German, French and English: A typological, contrastive and pedagogical approach. In: De Knop, S./De Rycker, T. (Eds.), *Cognitive Approaches to Pedagogical Grammar – A Volume in Honour of René Dirven*. Berlin: Mouton de Gruyter, 295–324.

De Knop, S./Gallez, F. (2013). Manner of motion: A privileged dimension of German expressions. In: Li, T. F. (Ed.), *Compendium of Cognitive Linguistics Research*. Hauppauge, NY: Nova Science Publishers, 25–42.

De Knop, S./Gilquin, G. (2016). *Applied Construction Grammar*. Berlin: de Gruyter. Applications of Cognitive Linguistics.

De Knop, S./Perrez, J. (2014). Conceptual metaphors as a tool for the efficient teaching of Dutch and German posture verbs. *Review of Cognitive Linguistics* 12: 1, 1–29.

De Knop, S. (2014). Conceptual tools for the description and the acquisition of the German posture verb 'sitzen'. In: De Knop, S./Meunier, F. (Eds.), *Learner Corpus Research, Cognitive Linguistics and Second Language Acquisition, special issue of Corpus Linguistics and Linguistic Theory* 11:1, 127–160.

De Knop, S. (2016). German causative events with placement verbs. *Lege Artis: Language Today, Yesterday, Tomorrow* 1: 2.

Dee-Lucas, D./Larkin, J. H. (1995). Learning from electronic texts: Effects of interactive overviews for information access. *Cognition and Instruction* 13: 3, 431–468.

Dell, G. S./Schwartz, M. F./Martin, N./Saffran, E. M./Gagnon, D. A. (1997). Lexical access in normal and aphasic speakers. *Psychological Review* 104, 801–838.

Deppert, A. (2001). Verstehen und Verständlichkeit: Wissenschaftstexte und die Rolle themaspezifischen Vorwissens. Wiesbaden: Deutscher Universitäts-Verlag.

Desrochers, A./Paivio, A. (1990). Le phonem initial des noms inanimes et son effet sur l'identification du genre grammatical [The initial phoneme of inanimate nouns and its effect for the identification of grammatical gender]. *Canadian Journal of Psychology* 44, 44–57.

DeStefano, D./LeFevre, J. (2007). Cognitive load in hypertext reading: A review. *Computers in Human Behavior* 23: 3, 1616–1641.

Deutsches PISA-Konsortium (Eds.), (2001). *PISA 2000 – Basiskompetenzen von Schülerinnen und Schülern im internationalen Vergleich*. Opladen: Leske + Budrich.

Di Pietro, R. J. (1987). *Strategic Interaction: Learning Languages Through Scenarios*. New York: Cambridge University Press.

Dietrich, R. (2007). *Psycholinguistik*. Sammlung Metzler: Vol. 342. Stuttgart: Metzler.

Dijk, T. A. van/Kintsch, W. (1983). *Strategies of Discourse Comprehension*. New York Academic Press.

Dijk, T. A. van (1980). *Macrostructures. An Interdisciplinary Study of Global Structures in Discourse, Interaction, and Cognition*. Hillsdale, N.J: Lawrence Erlbaum Associates.

Dirven, R./Ruiz de Mendoza Ibanez, F. (2010). Looking back at 30 years of Cognitive Linguistics. In: Tabakowska, E./Choinski, M./Wiraszka, L. (Eds.), *Cognitive Linguistics in Action: From Theory to Application and Back*. Berlin/New York: Mouton de Gruyter, 11–70.

Dirven, R./Taylor, J. (1994). English Modality: A cognitive-didactic approach. In: Carlon, K./Davidse, K./Rudzka-Ostyn, B./Vorlat, E. (Eds.): *Perspectives on English. Studies in Honour of Professor Emma Vorlat*. Leuven/Paris: Peeters, 542–556.

Dixon, C., Thomson, J. and Fricke, S. (2020). Language and reading development in children learning English as an additional language in primary school in England. *Journal of Research in Reading* 43: 3, 309–328.

Dörnyei, Z./Scott, M. L. (1997). Communication strategies in a second language: Definitions and taxonomies. *Language Learning* 47, 173–210.

Dörnyei, Z. (1995). On the teachability of communication strategies. *Tesol Quarterly* 29, 55–85.

Dörnyei, Z. (1997). Psychological processes in cooperative language learning: Group dynamics and motivation. *Modern Language Journal* 81, 482–493.

Dörnyei, Z. (2001). *Motivational Strategies in the Language Classroom*. Cambridge, UK: Cambridge University Press.

Drewer, P. (2003). *Die kognitive Metapher als Werkzeug des Denkens. Zur Rolle der Analogie bei der Gewinnung und Vermittlung wissenschaftlicher Erkenntnisse* (Forum für Fachsprachenforschung). Tübingen: Gunter Narr.

Drewniak, U. (1992). *Lernen mit Bildern in Texten: Untersuchung zur Optimierung des Lernerfolgs bei Benutzung computerpräsentierter Texte und Bilder*. Münster: Waxmann.

Driver, P. (2012). Pervasive games and mobile technologies for embodied language learning. *International Journal of Computer-Assisted Language Learning and Teaching* 2: 4, 50–63.

Dundes, A. (1984). *Life is Like a Chicken Coop Ladder: A Portrait of German Culture through Folklore*. New York: Columbia University Press.

Durrell, M./Hammer, A. E. (2011). *Hammer's German grammar and usage* (5th ed.). Abingdon/Oxon: Routledge Taylor & Francis Group.

Dutke, S. (1999). Der Crossover-Effekt von propositionaler Textrepräsentation und mentalem Modell: Zur Rolle interindividueller Fähigkeitsunterschiede. *Zeitschrift für Experimentelle Psychologie* 46: 3, 164–176.

Efklides, A. (2008). Metacognition. Defining its facets and levels of functioning in relation to self-regulation and co-regulation. *European Psychologist* 13 (4), 277–287.

Ehlers, S. (1998*). Lesetheorie und fremdsprachliche Lesepraxis aus der Perspektive des Deutschen als Fremdsprache*. Tübingen: Narr Verlag.

Ehrich, V./Vater, H. (1989). Das Perfekt im Dänischen und im Deutschen. In: Abraham, W./Janssen, T. (Eds.), *Tempus– Aspekt– Modus: Die lexikalischen und grammatischen Formen in den germanischen Sprachen*. Tübingen: Niemeyer, 103–132.

Eichler, N. (2011). *Code-Switching bei bilingual aufwachsenden Kindern. Eine Analyse der gemischtsprachlichen Nominalphrasen unter besonderer Berücksichtigung des Genus*. Tübingen: Narr.

Einstein, A. (1981). *Ideas and opinions*. New York: Dell.

Eisenberg, P. (2013). *Der Satz. Grundriss der deutschen Grammatik*. Stuttgart: J. B. Metzler.

Ellis, N./Cadierno, T. (2009). Constructing a Second Language. Introduction to the special section. *Annual Review of Cognitive Linguistics* 7, 11–139.

Ellis, N. C./Ferreira-Junior, F. (2009a). Construction learning as a function of frequency, frequency distribution, and function. *The Modern Language Journal* 93: 3, 370–385.

Ellis, N. C./Ferreira-Junior, F. (2009b). Constructions and their acquisition. Islands and the distinctiveness of their occupancy. *Annual Review of Cognitive Linguistics* 7, 187–220.

Ellis, R. (1990). *Instructed Second Language Acquisition. Learning in the Classroom*. Oxford: Basil Blackwell.

Ellis, R. (2009). Task-based language teaching: Sorting out the misunderstandings. *International Journal of Applied Linguistics* 19: 3, 221–246.

Engelkamp, J./Zimmer, H. D. (2006). Lehrbuch der kognitiven Psychologie. Göttingen: Hogrefe.

Ericsson, K. A. (2003). Exceptional memorizers: made, not born. *Trends in Cognitive Sciences* 7: 6, 233–235.

Ertmer, P. A./Newby, T. J. (1996). The expert learner: Strategic, selfregulated, and reflected. *Instructional Science* 24, 1–24.

Evans, V./Green, M. (2006). *Cognitive Linguistics. An Introduction*. Mahwah, N.J: L. Erlbaum.

Evans, V./Tyler, A. (2005). Applying cognitive linguistics to pedagogical grammar: the English prepositions of verticality. *Revista Brasileira de Linguistica Aplicada* 5: 2, 11–42.

Evans, V. (2004). *The Structure of Time: Language, Meaning and Temporal Cognition*. Amsterdam: Benjamins.

Evans, V. (2012). Cognitive linguistics. Wiley Interdisciplinary Reviews: *Cognitive Science* 3: 2, 129–141.

Eysenck, M. W./Keane, M. T. (2015). Cognitive Psychology. A Student's Handbook. New York: Psychology Press.

Fagan, S. (1991). The semantics of the positional predicates 'liegen'/'legen', 'sitzen'/'setzen', and 'stehen'/'stellen'. *Unterrichtpraxis/Teaching German* 24: 2, 136–145.

Fandrych, C./Thurnair, M. (2011). Textsorten im Deutschen. Linguistische Analysen aus sprachdidaktischer Sicht. Tübingen: Stauffenburg.

Fang-Yen Hsieh, A. (2014). The effect of cultural background and language proficiency on the use of oral communication strategies by second language learners of Chinese. *System* 45, 1–16.

Fauconnier, G./Turner, M. (2002). *The Way We Think. Conceptual Blending and the Mind's Hidden Complexities*. New York: Basic Books.

Fillmore, C. J. (1985), Frames and the semantics of understanding. *Quaderni di Semantica* 6, 222–254.

Fillmore, C. J. (1988). The Mechanisms of 'Construction Grammar'. *Proceedings of the Berkeley Linguistics Society* 14, 35–55.

Fillmore, C. J./Kay, P./O'Connor, M. C. (1988). Regularity and idiomaticity in grammatical constructions: The case of 'let alone'. *Language* 64: 3, 501–538.

Finkbeiner, C. (2005). *Interessen und Strategien beim fremdsprachlichen Lesen: Wie Schülerinnen und Schüler englische Texte lesen und verstehen. Giessener Beiträge zur Fremdsprachendidaktik*. Tübingen: Narr.

Fitzgerald, J. (1995). English-as-a-second-language learners' cognitive reading processes: A review of research in the United States. *Review of Educational Research* 65: 2, 145–190.

Fix, U./Habscheid, S./Klein, J. (2001). *Zur Kulturspezifik von Textsorten*. Tübingen: Stauffenburg.

Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive-developmental inquiry. *The American Psychologist* 34, 906–911.

Flavell, J. H. (1984). Annahmen zum Begriff Metakognition sowie zur Entwicklung von Metakognition. In: Weinert, F. E./Kluwe, R. H. (Eds.), *Metakognition, Motivation und Lernen*. Stuttgart: Kohlhammer, 23–31.

Flavell, J. H./Wellman, H. M. (1977). Metamemory. In: Kail, R. V./Hagen, J. W. (Eds.), *Perspectives on the development of memory and cognition Hillsdale*. NJ: Erlbaum.

Folker, S./Ritter, H./Sichelschmidt, L. (2005). Processing and integrating multimodal material – The influence of color-coding. In: Bara, B. G./Barsalou, L./Bucciarelli, M. (Eds.), *Proceedings of the 27th Annual Conference of the Cognitive Science Society*. Mahwah, NJ: Erlbaum, 690–695.

Foltz, P. (1996). Comprehension, coherence, and strategies in hypertext and linear text. In Rouet, J.-F./Levonen, J. J./Dillon, A./Spiro, Rand J. (Eds.), *Hypertext and Cognition*. Mahwah, NJ: Lawrence Erlbaum, 109–136.

Forceville, C. (2008). Metaphor in pictures and multimodal representations. In: Gibbs, R. W. Jr. (Ed.), *The Cambridge Handbook of Metaphor and Thought*. Cambridge: Cambridge University Press, 462–482.

Forster, K. I. (1976), Accessing the Mental Lexicon. In: Wales, R. J./Walker, E. (Eds.), *New Approaches to Language Mechanisms*. Amsterdam: North-Holland Pub. Co., 257–287.

Forster, M./Martschinke, S. (2001). *Leichter lesen und schreiben lernen mit der Hexe Susi. Das Nürnberger Trainingsverfahren zur phonologischen Bewusstheit*. Donauwörth: Auer.

Foschi A., M. (2009), Schreibpraxen im Germanistikstudium an den deutschen, französischen und italienischen Universitäten nach Bologna: ein Ausblick. In: Dalmas, M./Foschi, A. M./Neuland E. (Eds.), *Wissenschaftliche Textsorten im Germanistikstudium deutsch-italienisch-französisch kontrastiv. Trilaterales Forschungsprojekt in der Villa Vigoni (2007 – 2008)*, Villa Vigoni, 116–130.

Fraser, H. (2010). Cognitive Theory as a tool for teaching pronunciation. In: De Knop, S./Boers, F./De Rycker, A. (Eds.), *Fostering Language Teaching Efficiency through Cognitive Linguistics*. Berlin/New York: de Gruyter, 357–380.

Frazier, L. (1978). *On Comprehending Sentences: Syntactic Parsing Strategies*. Bloomington: Indiana University Linguistics Club.

Fredriksson, C. (2019). Lernerstrategien. In: Roche, J./Suñer Muñoz, F. (Eds.), *Sprachen lehren*. Tübingen: Narr, 313–323.

Freitag, Y./Vandermeeren, S. (2005). Deutsche Präpositionen: Eine fehleranalytische Untersuchung. Das Wort. Germanistisches Jahrbuch der GUS. DAAD Moskau, 155–181.

French, R. M./Jacquet, M. (2004). Understanding bilingual memory. Trends in Cognitive Science 8, 87–93.

Friedman, N. P./Miyake, A. (2000). Differential roles for visuospatial and verbal working memory in situation model construction. Journal of Experimental Psychology: General 129: 1, 61–83.

Friedrich, H. F./Mandl, H. (1992). Lern- und Denkstrategien–ein Problemaufriß. In: Mandl, H./Friedrich, H. F. (Eds.), *Lern und Denkstrategien– Analyse und Intervention*. Göttingen: Hogrefe, 3–54.

Friedrich, H. F. (1995). *Training und Transfer reduktiv-organisierender Strategien für das Lernen mit Texten*. Münster: Aschendorff.

Gaskell, M. G./Marslen-Wilson, W. D. (1997). Integrating form and meaning: A distributed model of speech perception. *Language and cognitive Processes* 12, 613–656.

Gathercole, S. E./Baddeley, A. D. (1993). *Working Memory and Language. Essays in Cognitive Psychology*. Hove: Erlbaum.

Geeraerts, D./Cuyckens, H. (2007). *The Oxford Handbook of Cognitive Linguistics*. Oxford, New York: Oxford University Press.

Geeraerts, D. (1989). Prospects and problems of prototype theory. *Linguistics* 27: 4, 587–612.

Gentner, D. (2001). Spatial metaphors in temporal reasoning. In: Gattis, M. (Ed.), *Spatial Schemas in Abstract Thought*. Cambridge, MA: MIT Press, 203–222.

Gentner, D./Imai, M./Boroditsky, L. (2002). As time goes by: Evidence for two systems in processing space > time metaphors. *Language and Cognitive Processes* 17, 537–565.

Gerdes, H. (1997). *Lernen mit Text und Hypertext*. Lengerich: Pabst.

Gerdes, H. (2000). Hypertext. In: Batinic, B. (Eds.), *Internet für Psychologen*. Göttingen: Hogrefe, 193–217.

Gerjets, P./Scheiter, K./Schuh, J. (2005). Instruktionale Unterstützung beim Fertigkeitserwerb aus Beispielen in hypertextbasierten Lernumgebungen. *Zeitschrift für pädagogische Psychologie* 19: 1/2, 23–38.

Gerling, M./Orthen, N. (1979). *Deutsche Zustands- und Bewegungsverben. Eine Untersuchung zu ihrer semantischen Struktur und Valenz*. Tübingen: Gunter Narr Verlag.

Ghatala, E. S. (1986). Strategy-monitoring training enables young learners to select effective strategies. *Educational Psychologist* 21: 1–2, 43–54.

Gibbs, R. W./Ferreira, L. C. (2011). Do people infer the entailments of conceptual metaphors during verbal metaphor understanding? In: Brdar, M./Gries, S. T./Fuchs, M. (Eds.), *Cognitive Linguistics: Convergence and Expansion*. Amsterdam: John Benjamins, 221–236.

Gibbs, R. W. Jr. (1994). *The Poetics of Mind: Figurative Thought, Language, and Understanding*.

Gidalevich, S./Kramarski, B. (2018). The value of fixed vs. faded self-regulatory scaffolds on fourth graders' mathematical problem solving. *Instructional Science* 47, 39–68.

Ginns, P. (2005). Meta-analysis of the modality effect. *Learning and Instruction* 15, 313–331.

Giora, R. (1999). On the priority of salient meanings: studies of literal and figurative language. *J. Pragmat* 31, 919–929.

Glaser, K. (2013). The neglected combination: A case for explicit-inductive instruction in teaching pragmatics in ESL. *TESL Canada Journal 30*: special issue 7, 150–163.

Gluck, M. A./Mercado, E./Myers, C. E. (2010). *Lernen und Gedächtnis: Vom Gehirn zum Verhalten*. Heidelberg: Spektrum, Akad. Verl.

Glucksberg, S. (2008). How metaphors create categories–quickly. In: Gibbs, R. W. Jr. (Ed.), *The Cambridge Handbook of Metaphor and Thought*. Cambridge: Cambridge University Press, 67–83.

Glucksberg, S./Newsome, M. R./Goldvarg, Y. (2001). Inhibition of the literal: Filtering metaphor-irrelevant material during metaphor comprehension. *Metaphor and Symbol* 16, 277–293.

Goatly, A. (2007). *Washing the Brain: Metaphor and Hidden Ideology*. Amsterdam: John Benjamins.

Goldberg, A. (1995). *Constructions: A Construction Grammar Approach to Argument Structure*. Chicago: University of Chicago Press.

Goldberg, A. (2006). *Constructions at Work: The Nature of Generalization in Language*. Oxford: Oxford University Press.

González Rey, Maria Isabel (2013). Presentation: Phraseodidactics, an applied field of Phraseology. In: González Rey, Maria Isabel (Eds.), *Phraseodidactic Studies on German as a Foreign Language/Phraseodidaktische Studien zu Deutsch als Fremdsprache*. Hamburg: Dr. Kovac, 7–10.

Götze, L./Hess-Lüttich, E. W. B. (2002). *Grammatik der deutschen Sprache. Sprachsystem und Sprachgebrauch*. München: Bertelsmann.

Gough, P. B. (1972). One second of reading. In: Kavanagh, J. F./Mattingly, I. G. (Eds.), *Language by Eye and Ear*. Cambridge: MIT Press, 331–358.

Grabe, W. (2009). *Reading in a Second Language Moving from Theory to Practice*. Cambridge: Cambridge University Press.

Gradečak-Erdeljić, T. (2009). Iconicity of the verbal expression – The case of "light" verbs in English. In Mario Brdar, Marija Omazić/Visnja Pavičić (eds.), Cognitive approaches to English: Fundamental, methodological, interdisciplinary and applied aspects. Newcastle upon Tyne: Cambridge Scholars Publishing, 3–26.

Gradel, V. (2020). *Der Erwerb der Adjektivdeklination durch kognitionslinguistisch basierte Apps im Unterricht des Deutschen als Fremdsprache*. Berlin/Münster: Lit Verlag.

Grady, J. E. (2005). Image schemas and perception refining a definition. In: Hampe, B. (Ed.), *From Perception to Meaning–Image Schemas in Cognitive Linguistic*. Berlin: De Gruyter, 35–56.

Grady, J. E. (2007). Metaphor. In: Geeraerts, D./Cuyckens, H. (Eds.), *The Oxford Handbook of Cognitive Linguistics*. Oxford: Oxford University Press, 187–213.

Graesser, A. C./Singer, M./Trabasso, T. (1994). Constructing inferences during narrative text comprehension. *Psychological Review* 95, 163–182.

Grass, A. (2013). Zur Veränderung mentaler Modelle beim Lernen mit Grammatikanimationen. *Zeitschrift für Interkulturellen Fremdsprachenunterricht* 18: 1, 62–71.

Graumann, A. (2004). Dynamics in and through causative connectives. In: Graumann, A./Holz, P./Plümacher, M. (Eds.), *Towards a Dynamic Theory of Language. A Festschrift for Wolfgang Wildgen on Occassion of his 80th Birthday*. Bochum: Universitätsverlag Brockmeyer, 197–210.

Green, D./Crinion, J./Price, C. (2006). Convergence, degeneracy and control. *Language Learning* 56, 99–125.

Grenfell, M./Distributed Leadership in Schools, V. (1999). *Modern Languages and Learning Strategies. In Theory and Practice*. London: Routledge.

Grießhaber, W. (2009). Präposition. In: Hoffmann, L. (Eds.), *Handbuch der Deutschen Wortarten*. Berlin, New York: Walter de Gruyter, 629–656.

Groot, de A. M. B. (1992). Bilingual lexical representation: A closer look at conceptual representations. In: Frost, R./Katz, L. (Eds.), *Orthography, Phonology, Morphology, and Meaning, Advances in Psychology*, Vol. 94. Oxford, England: North-Holland, 389–412.

Grosjean, F. (2010). *Bilingual: Life and Reality*. Cambridge, MA: Harvard University Press.

Grütz, D. (2010). »Unterstreiche das Wichtigste!« Empirische Befunde zu einer Text-verstehensstrategie. In: Schmidt, C./Lutjeharms, M. (Eds.), *Lesekompetenz in Erst-, Zweit- und Fremdsprache. Giessener Beiträge zur Fremdsprachendidaktik*. Tübingen: Gunter Narr, 89–106.

Guenther, F. H./Perkell, J. S. (2004). A neural model of speech production and its application to studies of the role of auditory feedback in speech. In: Maassen, B./Kent, R./Peters, H./van Lieshout, P./Hulstijn, W. (Eds.), *Speech Motor Control in Normal and Disordered Speech*. Oxford/New York: Oxford University Press, 29–50.

Gullberg, M. (2009). Reconstructing verb meaning in a second language: How English speakers of L2 Dutch talk and gesture about placement. *Annual Review of Cognitive Linguistics* 7, 222–245.

Günther, K. B. (1986). Ein Stufenmodell der Entwicklung kindlicher Lese- und Schreibstrategien. In: Brügelmann, Hans (Eds.), *ABC und Schriftsprache*. Konstanz: Faude, 32–54.

Gyselinck, V./Jamet, E./Dubois, V. (2008). The role of working memory components in multimedia comprehension. *Applied Cognitive Psychology* 22, 353–374.

Haller, E. P./Child, D. A./Walberg, H. J. (1988). Can comprehension be taught? A quantitative synthesis of metacognitive studies. *Educational Researcher* 17: 9, 5–8.

Hallet, W. (2008). Schreiben lernen mit dem Hypertext? Hypertextualität und generische Kohärenz in der Schreiberziehung. *Zeitschrift für Interkulturellen Fremdsprachenunterricht* 13: 1.

Hamada, M./Koda, K. (2008). Influence of first language orthographic experience on second language decoding and word learning. *Language Learning* 58: 1, 1–31.

Handwerker, B./Madlener, K. (2006). Multimedia-Chunks für Deutsch als Fremdsprache. Ein Lernmodul zur Entwicklung lexikalisch-grammatischer Kompetenz. In: Hahn, A./Klippel, F. (Eds.), *Sprachen Schaffen Chancen*. München: Oldenbourg, 199–206.

Handwerker, B. (2002). Chunks, Raster und Regeln. Vom Lexikon zur Grammatik in der Fremdsprachenvermittlung. In: Börner, W./Vogel, K. (Eds.): *Grammatik und Fremdsprachenerwerb. Kognition, psycholinguistische und erwerbstheoretische Perspektiven*. Tübingen: Narr, 207–230.

Handwerker, B. (2008). 'Chunks' und Konstruktionen – Zur Integration von lerntheoretischem und grammatischem Ansatz. *Estudios Filológicos Alemanes* 15, 49–64.

Harding, E./Paul, E./Mendl, M. (2004). Animal behaviour: cognitive bias andaffective state. *Nature* 427, 312–312.

Harley, T. A. (2014). *The Psychology of Language: From Data to Theory* (4th ed.). Hove: Psychology Press.

Hartmann, R. R. K. (1980). *Contrastive Textology. Comparative Discourse Analysis in Applied Linguistics*. Heidelberg: Groos.

Hartsuiker R. J./Pickering M. J./Veltkamp E. (2004). Is syntax separate or shared between languages? Cross-linguistic syntactic priming in Spanish-English bilinguals. *Psychological Science* 15, 409–414.

Hartsuiker, R. J./Pickering, M. J. (2008). Language integration in bilingual sentence production. *Acta Psychologica* 128, 479–489.

Hashemian, M./Talebinezhad, M. R. (2007). The development of conceptual fluency & metaphorical competence in L2 learners. *Linguistik Online* 30: 1.

Hasselhorn, M./Hager, W. (1998). Kognitive Trainings auf dem Prüfstand. Welche Komponenten charakterisieren erfolgreiche Fördermaßnahmen. In: Beck, M. (Ed.), *Evaluation als Maßnahme der Qualitätssicherung: Pädagogischpsychologische Interventionen auf dem Prüfstand*. Tübingen: Dgvt-Verl, 85–98.

Hasselhorn, M. (1992). Metakognition und Lernen. In: Nold, G. (Eds.), *Lernbedingungen und Lernstrategien: Welche Rolle spielen kognitive Verstehensstrukturen? Tübinger Beiträge zur Linguistik*. Tübingen: G. Narr, 35–65.

Hasselhorn, M. (1995). Kognitive Trainings. Grundlagen, Begrifflichkeiten, Desiderate. In: Hager, W. (Eds.), *Programme zur Förderung des Denkens bei Kindern: Konstruktion, Evaluation und Metaevaluation*. Götingen: Hogrefe, 41–85.

Hattie, J./Biggs, J./Purdie, N. (1996). Effects of learning skills interventions on student learning: A meta-analysis. *Review of Educational Research* 66: 2, 99–136.

Hausmann, F. J. (1984). Wortschatzlernen ist Kollokationslernen. *Praxis des neusprachlichen Unterrichts* 31, 395–406.

Hayes, J. R. (2006). New directions in writing theory. In: MacArthur, C. A./Graham, S./Fitzgerald, J. (Eds.), *Handbook of Writing Research*. New York: Guilford Press, 28–40.

Heinemann, M./Heinemann, W. (2002). *Grundlagen der Textlinguistik. Interaktion – Text – Diskurs*. Tübingen: Niemeyer.

Heinemann, W. (2000). Textsorte – Textmuster – Texttyp. In: Brinker, K./Antos, G./Heinemann, W./Sager, S. F. (Eds.), *Text- und Gesprächslinguistik. Handbücher zur Sprach- und Kommunikationswissenschaft*. Band 16. Textlinguistik. Berlin/New York: de Gruyter, 507–523.

Heisenberg, W. (1959). *Physik und Philosophie*. Stuttgart: Hirzel.

Heiß, A. (2007). *Desorientierung beim Lernen mit Hypermedien: Förderung struktureller und konzeptueller Orientierung*. Münster: Waxmann.

Helbig, P./Kirschhock, E./Martschinke, S./Kummer, U. (2006). *Schriftspracherwerb im entwicklungsorientierten Unterricht. Lernwege bereiten und begleiten*. Bad Heilbrunn: Klinkhardt.

Hendrich, A. (2003). *Spurenlesen – Hyperlinks als kohärenzbildendes Element in Hypertext*. München: Dissertation.

Henry, M. J. (1995). Remedial math students' navigation patterns through hypermedia software. *Computers in Human Behavior* 11: 3/4, 481–493.

Heredia, R. R./Brown, J. M. (2006). Bilingual Memory. In: Bhatia, T. K./Ritchie, W. (Eds.), *The Handbook of Bilingualism*. Oxford: Blackwell Publishing, 225–249.

Hersch, B. (2013). *Tabu, Erwachsenenspiel*. Boston: Hasbro.

Hijazo-Gascón, A./Cadierno, T./Ibarretxe-Antuñano, I. (2016). Learning the caused motion construction in L2 Spanish. In: De Knop, S./Gilquin, G. (Eds.), *Applied Construction Grammar*. Berlin. New York: de Gruyter, 185–210.

Hoffmann, I. (2018). Räumlich konzeptualisierte Funktionsverbgefüge – eine Erwerbsstudie. *Zeitschrift für Interkulturellen Fremsprachenunterricht* 2018:2, 74–85.

Hoffmann, J./Engelkamp, J. (2013). *Lern- und Gedächtnispsychologie*. Heidelberg: Springer.

Hoffmann, L. (2003). Einleitung. In: Hoffmann, L. (Ed.), *Funktionale Syntax*. Berlin/ New York: de Gruyter, 1–17.

Horasan, S. (2014). Code-switching in EFL classrooms and the perceptions of the students and teachers. *Journal of Language and Linguistic Studies* 10: 1, 31–45.

Horiba, Y. (1996). Comprehension processes in L2 reading. *Studies in Second Language Acquisition* 18: 4, 33–473.

Horiba, Y. (2000). Reader control in reading: Effects of language competence, text type, and task. *Discourse Processes* 29: 3, 223–267.

Horn, R. E. (1997). Structured writing as a paradigm. In: Dills, C./Romiszowski, A. (Eds.), *Instructional Development Paradigms*. Englewood Cliffs, N.J: Educational Technology Publ., 697–714.

Horst, M./Cobb, T./Meara, P. (1998). Beyond a Clockwork Orange: Acquiring second language vocabulary through reading. Reading in a Foreign Language 11: 2, 207–223.

Hottenroth, Priska-M. (2002). Fortbewegung und Ortswechsel im Französischen: Die semantische Struktur intransitiver Fortbewegungsverben und ihre Kombinatorik mit lokalen und direktionalen Präpositionen. In: Cuyckens, H./Radden, G. (Eds.), *Perspectives on Prepositions*. Tübingen: Niemeyer, 131–154.

Hotze, L. (2019). Gesten im Fremdsprachenunterricht: Verstehen, Memorieren, Problemlösen. In Jessen, M./Blomberg J./Roche, J. (Eds.), *Kognitive Linguistik*. Tübingen: Narr, 308–316.

Huber, O. (2002). *Hyper-Text-Linguistik. TAH: Ein textlinguistisches Analysemodell für Hypertexte*. München: Elektronisch veröffentlicht an der Universitätsbibliothek der Ludwig-Maximilians- Universität München (Univ., Diss.-München, 2002).

Hulstijn, J. H./Hollander, M./Greidanus, T. (1996). Incidental vocabulary learning by advanced foreign language students: The influence of marginal glosses, dictionary use, and reoccurrence of unknown words. *The Modern Language Journal* 80, 327–339.

Hunfeld, H. (1997). Zur Normalität des Fremden. Voraussetzungen eines Lehrplanes für Interkulturelles Lernen. In: BMW AG (Hg.): LIFE (Grundwerk), *Ideen und Materialien für interkulturelles Lernen*. Myünchen: BMW AG.

Hunt, A./Beglar, D. (1998). Current research and practice in teaching vocabulary. *The Language Teacherng*a.

Ifenthaler, D. (2010). Relational, structural and semantic analysis of graphical representationsand concept maps. Educational Technology Research and Development. *Education Tech Research Dev* 58, 81–97.

Indefrey, P. (2006). A meta-analysis of hemodynamic studies on first and second language processing: Which suggested differences can we trust and what do they mean? *Language Learning* 56, 279–304.

Iverson, P./Kuhl, P. K. (1995). Mapping the perceptual magnet effect for speech using signal detection theory and multidimensional scaling. *Journal of the Acoustical Society of America* 97: 1, 553–562.

Jacobsen, N. (2018). The best of both worlds: Combining cognitive linguistics and pedagogic tasks to teach english conditionals. *Applied Linguistics* 39: 5, 668–693.

Jäkel, O. (2003). *Wie Metaphern Wissen schaffen: Die kognitive Metapherntheorie und ihre Anwendung in Modell-Analysen der Diskursbereiche Geistestätigkeit, Wirtschaft, Wissenschaft und Religion*. Hamburg: Dr. Kovač.

Jarvis, S./Pavlenko, A. (2008). *Crosslinguistic influence in language and cognition*. New York: Routledge.

Jenkin, H./Prior, S. M./Rinaldo, R./Wainwright-Sharp, A. (1993). Understanding text in a second language: a psychological approach to an SLA problem. *Second language Research* 9: 2, 118–139.

Jescheniak, J. D./Levelt, W. J. M. (1994). Word frequency effects in speech production: retrieval of syntactic information and of phonological form. *Journal of Experimental Psychology: Learning, Memory, and Cognition* 20, 824–843.

Jessen, M./Cadiemo, T. (2013). Variation in the categorization of motion events by Danish, German, Turkish, and L2 Danish speakers. In: Goschler, J./Stefanowitsch, A. (Eds.), *Variation and Change in the Encoding of Motion Events*. Amsterdam: John Benjamins Publishing Company, 133–160.

Jeung, H./Chandler, P./Sweller, J. (1997). The role of visual indicators in dual sensory mode instruction. *Educational Psychology* 17: 3, 329–345.

Jiang, N. (2000). Lexical representation and development in a second language. *Applied Linguistics* 21, 47–77.

Jiang, N. (2002). Form-meaning mapping in vocabulary acquisition in a second language. *Studies in Second Language Acquisition* 24, 617–637.

Jiang, X./Grabe, W. (2007). Graphic organizers in reading instruction: Research findings and issues. *Reading in a Foreign Language* 19: 1, 34–55.

Johansson Falck, M./Gibbs, R. W. (2012). Embodied motivations for metaphorical meanings. *Cognitive Linguistics* 23: 2, 251–272.

Johnson, M. (1987). *The Body in the Mind: The Bodily Basis of Meaning, Imagination, and Reason*. Chicago: University of Chicago Press.

Johnson, M. (2005). The philosophical significance of image schemas. In: Hampe, B./Grady, J. E. (Eds.), *From Perception to Meaning*. Berlin/New York: de Gruyter, 15–34.

Johnson-Laird, P. N. (1983). *Mental Models: Towards a Cognitive Science of Language, Inference, and Consciousness*. Cambridge: Cambridge University Press.

Kalyuga, S. (2014). The expertise reversal principle in multimedia learning. In: Mayer, R. E. (Ed.), *The Cambridge Handbook of Multimedia Learning* (2nd ed.). Cambridge: Cambridge University Press, 576–597.

Kalyuga, S./Ayres, P./Chandler, P./Sweller, J. (2003). The expertise reversal effect. *Educational Psychologist* 38: 1, 23–31.

Kalyuga, S./Chandler, P./Tuovinen, J. E./Sweller, J. (2001). When problem solving is superior to studying worked examples. *Journal of Educational Psychology* 93: 3, 579–588.

Kanaplianik, K. (2016). *Kognitionslinguistische Animationen für die deutschen Modalverben. Zusammenspiel der kognitiven Linguistik und des multimedialen Lernens bei der Sprachvermittlung*. Berlin & Münster: Lit.

Kam, E.F./Liu, Y. /Tseng, W. (2020). *Effects of modality preference and working memory capacity on captioned videos in enhancing L2 listening outcomes*. Published online by Cambridge University Press.

Kasper, G. (1997). Can pragmatic competence be taught? (NFLRC NetWork #6). *Second Language Teaching and Curriculum Center*.

Katz, L./Frost, R. (1992). The reading process is different for different orthographies: The orthographic depth hypothesis. In: Katz, L./Frost, R. (Eds.), *Orthography, Phonology, Morphology and Meaning. Advances in Psychology*. Amsterdam: Elsevier, 67–84.

Kauffman, D. F./Ge, X./Xie, K./Chen, C.-H. (2008). Prompting in web-based environments: Supporting self-monitoring and problem solving skills in college students. *Journal of Educational Computing Research* 38: 2, 115–137.

Kecskés, I./Papp, T. (2000). *Foreign Language and Mother Tongue*. Mahwah, NJ: Lawrence Erlbaum.

Keller, T./Grimm, M. (2005). The impact of dimensionality and color coding of information visualizations on knowledge acquisition. In: Tergan, S.-O./Keller, T. (Eds.), *Knowledge and Information Visualization. Searching for Synergies*. Berlin/Heidelberg: Springer, 167–182.

Kester, L./Kirschner, P. A./van Merriënboer, J. J. G. (2004a). Information presentation and troubleshooting in electrical circuits. *International Journal of Science Education* 26, 239–256.

Kester, L./Kirschner, P. A./van Merriënboer, J. J. G. (2004b). Timing of information presentation in learning statistics. *Instructional Science* 32, 233–252.

Kester, L./Kirschner, P.A./van Merriënboer, J. J. G. (2005). The management of cognitive load during complex cognitive skill acquisition by means of computer-simulated problem solving. *British Journal of Educational Technology* 75: 1, 71–85.

Kieffer, M. J./Lesaux, N. K. (2008). The role of derivational morphology in the reading comprehension of Spanish-speaking English language learners. *Reading and Writing: An Interdisciplinary Journal* 21: 8, 783–804.

Kimmel, M. (2005). Culture regained: Situated and compound image schemas. In: Hampe, B./Grady, J. E. (Eds.), *From Perception to Meaning*. Berlin/New York: de Gruyter, 285–311.

Kintsch, W. (1998). *Comprehension: A Paradigm for Cognition*. New York: Cambridge University Press.

Kintsch, W. (2005). An Overview of Top-Down and Bottom-Up Effects in Comprehension: The CI Perspective. *Discourse Process* 39: 2/3, 125–128.

Kintsch, W./Welsch, D. M./Schmalhofer, F./Zimny, S. (1990). Sentence memory: A theoretical analysis. *Journal of Memory and Language* 29, 133–159.

Klein, W. (1994). *Time in Language*. London, New York: Routledge.

Klenk, U. (2003). *Generative Syntax*. Tübingen: Gunter Narr Verlag.

Klicpera, C./Gasteiger-Klicpera, B. (1995). *Psychologie der Lese- und Schreibschwierigkeiten–Entwicklung, Ursachen, Förderung*. Weinheim: Psychologie Verlags Union.

Klois, S. S./Segers, E./Verhoeven, L. (2013). How hypertext fosters children's knowledge acquisition: The roles of text structure and graphical overview. *Computers in Human Behavior* 29: 5, 2047–2057.

Kluge, F. (1883/2011). *Etymologisches Wörterbuch der deutschen Sprache*. Straßburg: Trübner/Berlin: de Gruyter.

Kluwe, R. H. (1981). Metakognition. In: Michaelis, W. (Ed.), *Bericht über den 32. Kongreß der deutschen Gesellschaft für Psychologie in Zürich 1980*. Göttigen: Hogrefe, 246–258.

Kluwe, R. H. (1982). Cognitive knowledge and executive control: metacognition. In: Griffin, D. R. (Ed.), *Human Mind – Animal Mind*. Berlin: Springer, 201–224.

Knauff, M./Johnson-Laird, P. N. (2002). Visual imagery can impede reasoning. *Memory and Cognition* 30: 3, 363–371.

Knauff, M./May, E. (2006). Mental imagery, reasoning, and blindness. *Quarterly Journal of Experimental Psychology* 59, 161–177.

Knauff, M./Schlieder, C. (2005). Spatial inference: No difference between mental images and models. *Behavioural and Brain Sciences* 27: 4, 589–590.

Koch, C. (1992). Combining connectionist and hypertext techniques in the study of texts: A HyperNet approach to literary scholarship. *Literary and Linguistic Computing* 7: 4, 209–217.

Koda, K. (2005). *Insights into Second Language Reading: A Cross-Linguistic Approach*. Cambridge: Cambridge University Press.

Koeppel, R. (2010). *Deutsch als Fremdsprache – Spracherwerblich reflektierte Unterrichtspraxis*. Baltmannsweiler: Schneider Verlag Hohengehren.

Kohl-Dietrich, D./Constanze, J./Wolfgang, S. (2016). Conceptual motivation as a tool for raising language awareness in the English as a foreign language classroom – Does it enhance learning outcomes? *Yearbook of the German Cognitive Linguistics Association.*

Kövecses, Z. (2010). A new look at metaphorical creativity in cognitive linguistics. *Cognitive Linguistics* 21: 4, 663–697.

Kövecses, Z. (2015). *Where Metaphors Come From*. Oxford: Oxford University Press.

Krems, J. F. (2001). Zur Gestaltung informativer Hypertexte. In: Boehnke, K./Döring, N. (Eds.), *DFG-Forschergruppe »Neue Medien im Alltag«: Vol. 2. Neue Medien im Alltag: Die Vielfalt individueller Nutzungsweisen*. Lengerich: Pabst, 14–34.

Kroll, J. F./Groot de, A. M. B. (1997). Lexical and conceptual memory in the bilingual: mapping form to meaning in two languages. In: Groot, A. M. B. de/Kroll, J. F. (Eds.), *Tutorials in Bilinguism. Psycholinguistic perspectives*. Mahwah, N. J.: Lawrence Erlbaum Associates, 169–199.

Kroll, J. F./Stewart, E. (1994). Category interference in translation and picture naming: Evidence for asymmetric connections between bilingual memory representations. *Journal of Memory and Language* 33, 149–174.

Kroll, J. F./Sunderman, G. (2003). Cognitive processes in second language acquisition: The development of lexical and conceptual representations. In: Doughty, C. J./Long, M. H. (Eds.), *Handbook of Second Language Acquisition*. Cambridge, MA: Blackwell, 104–129.

Kroll, J. F./Michael, E./Tokowicz, N./Dufour, R. (2002). The development of lexical fluency in a second language. *Second Language Research* 18, 137–171.

Krusche, D./Krechel, R. (1984). *Anspiel. Konkrete Poesie im Unterricht Deutsch al Fremdsprache*. Bonn: Inter Nationes.

Kuhl, P. K. (1991). Human adults and human infants show a »perceptual magnet effect« for the prototypes of speech categories, monkeys do not. *Perception & Psycholinguistics* 50, 93–107.

Kuhl, P. K. (1998). The development of speech and language. In: Carew, T. J./M., Randalf/Shatz, C. J. (Eds.), *Mechanistic relationships between development and learning*. New York: Wiley, 53–73.

Kürschner, C./Seufert, T./Hauck, G./Schnotz, W./Eid, M. (2006). Konstruktion visuell-räumlicher Repräsentationen beim Hör- und Leseverstehen. *Zeitschrift für Psychologie* 214: 3, 117–132.

Küspert, P./Schneider, W. (2008). *Hören, lauschen, lernen: Sprachspiele für Kinder im Vorschulalter; Würzburger Trainingsprogramm zur Vorbereitung auf den Erwerb der Schriftsprache*. (6. Aufl.). Göttingen: Vandenhoeck & Ruprecht.

Lackerbauer, I. (2003). *Handbuch für Online-Texter und Online-Redakteure*. Berlin: Springer.

Ladewig, S. (2019a). Gesten als Teil von Sprachen – Die moderne Gestikforschung. In Jessen, M./Blomberg J./Roche, J. (Eds.), *Kognitive Linguistik*. Tübingen: Narr, 284–294.

Ladewig, S. (2019b). Gesten und ihre Bedeutung. In Jessen, M./Blomberg J./Roche, J. (Eds.), *Kognitive Linguistik*. Tübingen: Narr, 295–307.

Lado, R./Fries, C. C. (1943/1967). *English pattern practices: Establishing the patterns as habits*. Ann Arbor: The University of Michigan Press.

Lafford, B. A. (2004). The effect of the context of learning on the use of communication strategies by learners of Spanish as a second language. *Studies in Second Language Acquisition* 26: 2, 201–225.

Lakoff, G./Johnson, M. (1980). *Metaphors we live by*. Chicago: The University of Chicago Press.

Lakoff, G./Johnson, M. (1999). *Philosophy in the Flesh. The Embodied Mind and its Challenge to Western Thought*. New York: Basic Books.

Lakoff, G. (1987). *Women, Fire, and Dangerous Things*. Chicago: The University of Chicago Press.

Lakoff, G. (2008). The neural theory of metaphor. In: Gibbs, R. (Ed.), *The Cambridge Handbook of Metaphor and Thought*. Cambridge: Cambridge University Press, 17–37.

Lampert, G./Lampert, M. (2000). *The Conceptual Structure(s) of Modality. Essences and Ideologies: A Study in Linguistic (Meta-) Categorization*. Frankfurt am Main/New York: Peter Lang.

Langacker, R. W. (1987). *Foundations of Cognitive Grammar: Vol. 1. Theoretical Prerequisites*. Stanford: Stanford University Press.

Langacker, R. W. (1991). *Descriptive Application. Foundations of Cognitive Grammar*. Stanford: Stanford University Press.

Langacker, R. W. (2000). *Grammar and Conceptualization*. Berlin/New York: Mouton de Gruyter.

Langacker, R. W. (2004). Grammar as image: The case of voice. In: Lewandowska-Tomaszczyk, B./Kwiatkowska, A. (Eds.), *Imagery in Language: Festschrift in Honour of Professor Ronald W. Langacker*. Frankfurt am Main: Lang, 63–114.

Langacker, R. W. (2007). Cognitive grammar. In: Geeraerts, D./Cuyckens, H. (Eds.), *The Oxford Handbook of Cognitive Linguistics*. Oxford/New York: Oxford University Press, 421–462.

Langacker, R. W. (2008a). Cognitive grammar as a basis for language instruction. In: Robinson, P./Ellis, N. C. (Eds.), *Handbook of Cognitive Linguistics and Second Language Acquisition*. New York: Routledge, 66–88.

Langacker, R. W. (2008b). *Cognitive Grammar. A Basic Introduction*. Oxford/New York: Oxford University Press.

Langacker, R. W. (2008c). The relevance of cognitive grammar for language pedagogy. In: De Knop, S./de Rycker, T. (Eds.), *Cognitive Approaches to Pedagogical Grammar*. Berlin/New York: Mouton de Gruyter, 7–35.

Langacker, R. W. (2009). A dynamic view of usage and language acquisition. *Cognitive Linguistics* 20: 3, 627–640.

Langacker, R. W. (2011). Convergence in cognitive linguistics. In: Brdar, M./Gries, S. T./Fuchs, M. Z. (Eds.), *Cognitive Linguistics: Convergence and Expansion*. Amsterdam: John Benjamins Publishing Company, 9–16.

Leahy, W./Chandler, P./Sweller, J. (2003). When auditory presentations should and should not be a component of multimedia instruction. *Applied Cognitive Psychology* 17, 401–418.

Lee, M. J./Tedder, M. C. (2003). The effects of three different computer texts on readers' recall: Based on working memory capacity. *Computers in Human Behavior* 19: 6, 767–783.

Lee, M./Révész, L. (2018). Promoting grammatical development through captions and textual enhancement in multimodal input-based tasks. London: WC1H OAL. *Studies in Second Language Acquisition* 42: 3, 1–27.

Lemmens, M. (2006). Caused posture: Experiential patterns emerging from corpus research. In: Gries, S. T./Stefanowitsch, A. (Eds.), *Corpora in Cognitive Linguistics: Corpus-Based Approaches to Syntax and Lexis*. Berlin: de Gruyter, 261–297.

Lenneberg, E. H. (1967). *Biological Foundations of Language*. New York: Wiley & Sons.

Leutner, D. (2002). Adaptivität und Adaptierbarkeit multimedialer Lehr- und Informationssysteme. In: Issing, L./Klimsa, P. (Eds.), *Information und Lernen mit Multimedia und Internet. Lehrbuch für Studium und Praxis*. Weinheim: Beltz PVU, 115–126.

Leutner, D./Barthel, A./Schreiber, B. (2001). Studierende können lernen, sich selbst zum Lernen zu motivieren: Ein Trainingsexperiment. *Zeitschrift für pädagogische Psychologie* 15: 3/4, 155–167.

Levelt, W. J. M. (1983). Monitoring and self-repair in speech. *Cognition* 14, 41–104.

Levelt, W. J. M. (1989). *Speaking. From Intention to Articulation*. Cambrige, Mass.: MIT Press.

Levelt, W. J. M., Schriefers, H., Vorberg, D., Meyer, A. S., Pechmann, T./Havinga, J. (1991). The time course of lexical access in speech production: A study of picture naming. *Psychological Review, 98*: 1, 122–142.

Levelt, W. J. M. (1999). Producing spoken language: A blueprint of the speaker. In: Brown, C. M./Hagoort, P. (Eds.), *The Neurocognition of Language*. Oxford/New York: Oxford University Press, 88–122.

Levelt, W./Roelofs, A./Meyer, A. (1999). A theory of lexical access in speech production. *Behavioral and Brain Sciences* 22, 1–75.

Levinson, S. C. (2003). *Space in Language and Cognition*. Cambridge, Cambridge University Press.

Lin, X./Lehman, J. D. (1999). Supporting learning of variable control in a computerbased biology environment: Effects of prompting college students to reflect on their own thinking. *Journal of Research in Science Teaching* 36: 7, 837–858.

Lin, X. (2001). Designing metacognitive activities. *Educational Technology Research and Development* 49: 2, 23–40.

Lin, X./Hmelo, C./Kinzer C. K./Secules, T. (1999). Designing technology to support reflection. *Educational Technology Research and Development* 47: 3, 43–62.

Linderholm, T./Broek, P. van den (2002). The effects of reading purpose and working memory capacity on the processing of expository text. *Journal of Educational Psychology* 94: 4, 778–784.

Linderholm, T./Virtue, S./Tzeng, Y./van den Broek, P. (2004). Fluctuations in the availability of information during reading: Capturing cognitive processes using the Landscape Model. *Discourse Processes* 37, 165–186.

Liontas, J. I. (2002). Context and idiom understanding in second languages. *EUROSLA Yearbook* 2, 155–185.

Littlemore, J./Low, G. (2006a). Metaphoric competence and communicative language ability. *Applied Linguistics* 27: 2, 268–294.

Littlemore, J./Low, G. (2006b). *Figurative Thinking and Foreign Language Learning*. Basingstoke/New York: Palgrave Macmillan.

Littlemore, J. (2001). An empirical study of the relationship between cognitive style and the use of communication strategy. *Applied Linguistics* 22: 2, 241–265.

Littlemore, J. (2003). The communicative effectiveness of different types of communication strategy. *System* 31, 331–347.

Littlemore, J. (2009). *Applying Cognitive Linguistics to Second Language Learning and Teaching*. London: Palgrave MacMillan.

Littlemore, J. (2016). Metaphor use in educational contexts. In Semino. E./Demjén, Z. (Eds.), *The Routledge Handbook of Metaphor and Language*. London: Routledge.

Littlemore, J. (2019). *Metaphors in the Mind: Sources of Variation in Embodied Metaphor*. Cambridge: Cambridge University Press.

Littlemore, J./Krenmayr, T./Turner, J./Turner, S. (2013). An investigation into metaphor use at different levels of second language writing. *Applied Linguistics* 32: 4, 208–429.

Littlemore, J./Taylor, J. R (2014). *The Bloomsbury Companion to Cognitive Linguistics*. London: Bloomsbury.

Loebell, H./Bock, K. (2003). Structural priming across languages. *Linguistics* 41, 791–824.

Logie, R. H. (1995). *Visuo-spatial Working Memory*. Hove, UK: Erlbaum.Long, Oppy/Seely 1997.

Longoni, A. M./Richardson, J. T. E./Aiello, A. (1993). Articulatory rehearsal and phonological storage in working memory. *Memory and Cognition* 21: 1, 11–22.

Louwerse, M. M./Graesser, A. C. (2006). Macrostructure. In: Brown, K. (Ed.), *Encyclopedia of language & linguistics* (2nd ed.). Amsterdam: Elsevier, 426–429.

Low, G./Littlemore, J. (2009). The relationship between conceptual metaphors and classroom management language: Reactions by native and non-native speakers of English. *Ibérica* 17, 25–44.

Low, R./Sweller, J. (2005). The modality principle in multimedia learning. In: Mayer, R. E. (Ed.), *The Cambridge Handbook of Multimedia Learning*. Cambridge: Cambridge University Press, 147–158.

Lowe, R. K./Schnotz, W. (2014). Animation principles in multimedia learning. In Mayer, Richard E. (Ed.), *The Oxford Handbook of Multimedia Learning*. Oxford: Oxford University Press, 513–546.

Luce, P. A./McLennan, C. T. (2005). Spoken word recognition: The challenge of variation. In: Pisoni, D. B./Remez, R. E. (Eds.), *Handbook of Speech Perception*. Malden, MA: Blackwell, 591–609.

Lutjeharms, M. (2010). Der Leseprozess in Mutter- und Fremdsprache. In: Lutjeharms, M./Schmidt, C. (Eds.), *Lesekompetenz in Erst-, Zweit- und Fremdsprache*. Tübingen: Gunter Narr, 11–26.

Lutzeier, P. R. (1995). Von der Wortbedeutung zur Satzbedeutung: Überlegungen zum Beitrag der Präpositionen. In: Pohl, I. (Eds.), *Semantik von Wort, Satz und Text: Beiträge des Kolloquiums »Semantik von Wort, Satz und Text« in Rostock (1994)*. Frankfurt a. M.: Peter Lang, 171–189.

Macaro, E. (2006). Codeswitching in the L2 classroom: A communication and learning strategy. In: Llurda, E. (Ed.), *Non-Native Language Teachers: Perceptions, Challenges and Contributions to the Profession*. Amsterdam: Springer, 63–84.

MacArthur, F./Littlemore, J. (2008). A discovery approach using corpora in the foreign language classroom. In: Boers, F./Lindstromberg, S. (Eds.), *Cognitive Linguistic Approaches to Teaching Vocabulary and Phraseology*. Amsterdam: Mouton de Gruyter, 159–188.

Madlener, K. (2015). *Frequency Effects in Instructed Second Language Acquisition*. Berlin: de Gruyter.

Madrid, R. I./van Oostendorp, H./Puerta Melguizo, M. C. (2009). The effects of the number of links and navigation support on cognitive load and learning with hypertext: The mediating role of reading order. *Computers in Human Behavior* 25, 66–75.

Maguire, E./Spiers, H./Good, C./Hartley, T./Frackowiak, R./Burgess, N. (2003). Navigation expertise and the human hippocampus: A structural brain imaging analysis. *Hippocampus* 13, 250–259.

Mandl, H., Friedrich, F./Hron, A. (1988). Theoretische Ansätze zum Wissenserwerb. In Mandl, H./Spada, H. (Eds.), *Wissenspsychologie*. München: Psychologie-Verlags-Union, 123–160.

Marslen-Wilson, W./Tyler, L. K. (1980). The temporal structure of spoken language understanding. *Cognition* 8: 1, 1–71.

Masna, Y. (2020). Englisia: Journal of Language, Education, and Humanities 8: 1, 93–101.

Maule, R. W. (2000). Metacognitive research and development framework (MRDF) for internet instructional science software. *Internet Research: Elektronik Networking Applications and Policy* 10: 4, 329–346.

Mayer, R. E./Johnson, C. I. (2008). Revising the redundancy principle in multimedia learning. *Journal of Educational Psychology* 100, 380–386.

Mayer, R. E. /Moreno, R. (2003). Nine ways to reduce cognitive load in multimedia learning. *Educational Psychologist* 38: 1, 43–52.

Mayer, R. E./Sims, V. K. (1994). For whom is a picture worth a thousand words? Extensions of a dual-coding theory of multimedia learning. *Journal of Educational Psychology* 86: 3, 389–401. Mayer, R. E. (2002). Cognitive theory and the design of multimedia instruction: An example of the two-way street between cognition and instruction. *New Directions for Teaching and Learning* 89, 55–71.

Mayer, R. E. (2005a). Cognitive theory of multimedia learning. In: Mayer, R. E. (Ed.), *The Cambridge Handbook of Multimedia Learning*. Cambridge: Cambridge University Press, 31–48.

Mayer, R. E. (2005b). Principles for managing essential processing in multimedia learning: segmenting, pertaining, and modality principles. In: R. E. Mayer (Ed.), *The Cambridge Handbook of Multimedia Learning*. Cambridge: Cambridge University Press, 169–182.

Mayer, R. E. (2009). *Multimedia Learning*. New York: Cambridge University Press.

Mayer, R. E. (2014). *The Cambridge Handbook of Multimedia Learning*. Cambridge: Cambridge University Press.

Mayer, R. E./Lee, H./Peebles, A. (2014). Multimedia learning in a second language: A cognitive load perspective. *Applied Cognitive Psychology* 28: 5, 653–660.

McClelland, J. L./Elman, J. L. (1986). The TRACE model of speech perception. *Cognitive Psychology* 18, 1–86.

McClelland, J. L./Rumelhart, D. E. (1981). An interactive activation model of context effects in letter perception: Part I. An account of basic findings. *Psychological Review* 88, 375–407.

McDonough, K./Trofimovich, P. (2008). *Using Priming Methods in Second Language Research*. London: Routledge.

McEneaney, J. E. (2003). Does hypertext disadvantage less-able readers? *Journal of Educational Computing Research* 29: 1, 1–12.

McInerney, V./McInerney, D. M./Marsh, H. W. (1997). Effects of metacognitive strategy training within a cooperative group learning context on computer achievement and anxiety: An aptitude-treatment interaction study. *Journal of Educational Psychology* 89: 4, 686–695.

McNamara, D. S./Shapiro, A. M. (2005). Multimedia and hypermedia solutions for promoting metacognitive engagement, coherence, and learning. *Journal of Educational Computing Research* 33: 1, 1–29.

McNamara, D. S./Kintsch, W. (1996). Learning from text: Effects of prior knowledge and text coherence. *Discourse Processes 33*, 247–288.

McQueen, J. M./Cutler, A./Norris, D. (2003). Flow of information in the spoken word recognition system. *Speech Communication* 41, 257–270.

McQueen, J. M./Norris, D./Cutler, A. (1994). Competition in spoken word recognition: Spotting words in other words. *Journal of Experimental Psychology: Learning, Memory and Cognition* 20: 3, 621–638.

McQueen, J. M./Norris, D./Cutler, A. (1999). Lexical influence in phonetic decisionmaking: Evidence from subcategorical mismatches. *Journal of Experimental Psychology: Human Perception and Performance* 25, 1363–1389.

Meex, B./Mortelmans, T. (2002). Grammatik und Kognition. Deutsch anders gedacht. *Germanistische Mitteilungen* 56, 48–66.

Merriënboer, J. J. G. van/Crook de, M. B. M. (1992). Strategies for computer-based programming instruction: Program completion vs. program generation. *Journal of Educational Computing Research* 8, 365–394.

Merriënboer, J. J. G. van/Kester, L. (2014). The four-component instructional design model – Multimedia principles in environments for complex learning. In: Mayer, R. E. (Ed.), *The Cambridge Handbook of Multimedia Learning* (2nd ed.). Cambridge: Cambridge UniversityPress, 104–148.

Merriënboer, J. J. G. van/Sweller, J. (2010). Cognitive load theory in health professional education: design principles and strategies. *Medical Education* 44: 1, 85–93.

Merriënboer, J. J. G. van/Sweller, J. (2010). Cognitive load theory in health professional education: design principles and strategies. *Medical Education* 44: 1, 85–93.

Merriënboer, J. J. G. van (1990). Strategies for programming instruction in high school: Program completion vs. program generation. *Journal of Educational Computing Research* 6, 265–287.

Merriënboer, J. J. G. van/Schuurman, J./Croock de, M. B. M./Paas, F. G. W. C. (2002). Redirecting learner's attention during training: Effects on cognitive load, transfer test performance and training efficiency. *Learning and Instruction* 12, 11–37.

Miller, C. S./Lehman, J. F./Koedinger, K. R. (1999). Goals and learning in microworlds. *Cognitive Science* 23: 3, 305–336.

Miller, G. A. (1956). The magical number seven, plus or minus two: some limits on our capacity for processing information. *Psychological Review* 101: 1, 81–96.

Mitterer, H./McQueen, J. M. (2009). Foreign subtitles help but native-language subtitles harm foreign speech perception. *PLOS ONE* 4: 11.

Möller, J./Müller-Kalthoff, T. (2000). Lernen mit Hypertext: Effekte von Navigationshilfen und Vorwissen. *Zeitschrift für pädagogische Psychologie*, 14: 2/3, 116–123.

Mokhtari, K./Reichard, C. A. (2002). Assessing students' metacognitive awareness of reading strategies. *Journal of Educational Psychology* 94: 2, 249–259.

Moraitou, D./Metallidou, P. (Eds.) (2021). *Trends and Prospects in Metacognition Research across the Life Span A Tribute to Anastasia Efklides*. Switzerland: Springer Nature Switzerland AG, v–xix.

Moreno, R./Mayer, R. E. (1999). Cognitive principles of multimedia design: the role of modality and contiguity. *Journal of Educational Psychology* 91: 2, 358–368.

Moreno, R./Mayer, R. E. (2002). Learning science in virtual reality multimedia environment: role of methods and media. *Journal of Educational Psychology* 94: 3, 598–610.

Moreno, R./Mayer, R. E./Spires, H. A./Lester, J. C. (2001). The case for social agency in computer-based teaching: do students learn more deeply when they interact with animated pedagogical agents? *Cognition and Instruction* 19: 2, 177–213.

Mousavi, S. Y./Low, R./Sweller, J. (1995). Reducing cognitive load by mixing auditory and visual presentation modes. *Journal of Educational Psychology* 87: 2, 319–334.

Müller, C. (2017). How recurrent gestures mean: Conventionalized contexts-of-use and embodied motivation. In: Wehling, E./Sweetser, E. (Eds.), *Special Issue of the Journal Gesture on 'Gesture Pragmatics'*, 16: 2, 278–306.

Müller-Jacquier, B.-D. (1981). *Konfrontative Semantik*. Weil der Stadt: Narr.

Müller-Kalthoff, T. (2006). *Vorwissen und Navigationshilfen beim Hypertextlernen*. Münster: Waxmann.

Müller-Kalthoff, T./Möller, J. (2006). Browsing while reading: Effects of instructional design and learners' prior knowledge. ALT-J, *Research in Learning Technology*, 183–198.

Munser-Kiefer, M. (2014*). Leseförderung im Leseteam in der Grundschule. Eine Interventionsstudie zur Förderung von basaler Lesefertigkeit und (meta-)kognitiven Lesestrategien*. Band 40. Münster: Waxmann Verlag.

Mwangi, W./Sweller, J. (1998). Learning to solve compare word problems: the effect of example format and generating self-explanations. *Cognition and Instruction* 16: 2, 173–199.

Narasimhan, B./Kopecka, A./Bowerman, M./Gullberg, M./Majid, A. (2012). Putting and taking events: A crosslinguistic perspective. In: Kopecka, A./Narasimhan, B. (Eds.), *Events of Putting and Taking: A Cross-Linguistic Perspective*. Amsterdam: John Benjamins, 1–18.

Nassaji, H. (2007). Schema theory and knowledge-based processes in second language reading comprehension: A need for alternative perspectives. *Language Learning*, 57: 1, 79–113.

Nattinger, J. R./DeCarrico, J. S. (1992). *Lexical Phrases and Language Teaching*. Oxford: Oxford University Press.

Naumann, A./Waniek, J./Krems, J. F. (2001). Knowledge acquisition, navigation and eye movements from text and hypertext. In: Reips, U.-D./Bosnjak, M. (Eds.), *Dimensions of Internet Science*. Lengerich: Pabst, 293–304.

Neveling, C. (2004). *Wörterlernen mit Wörternetzen*. Tübingen: Gunter Narr Verlag.

Neveling, C. (2005). Die Konstruktion von Wörtemetzen. Eine Speicherstrategie nach dem mentalen Lexikon. *Praxis Fremdsprachenunterricht* 2: 1, 28–32.

Niemeier, S. (2017). *Task-based grammar teaching of English - where cognitive grammar and task-based language teaching meet*. Tübingen: Narr.

Niemeier, S./Reif, M. (2008). Making progress simpler? Applying cognitive grammar to tense-aspect teaching in the German EFL classroom. In: De Knop, S./de Rycker, T. (Eds.), *Cognitive Approaches to Pedagogical Grammar*. Berlin/New York: Mouton de Gruyter, 225–255.

Norris, D. (1994). Shortlist: A connectionist model of continuous speech recognition. *Cognition* 52, 189–234.

Norris, J. M./Ortega, L. (2000). Effectiveness of L2 instruction: A research synthesis and quantitative meta-analysis. *Language Learning* 50: 3, 417–528.

Nunan, D. (1991). Communicative Tasks and the Language Curriculum. *Tesol Quarterly* 25: 2, 279–295.

O'Malley, J. M./Chamot, A. U. (1990). *Learning Strategies in Second Language Acquisition*. Cambridge: Cambridge University Press.

Oakley, T. (2007). Image schemas. In: Geeraerts, D./Cuyckens, H. (Eds.), *The Oxford Handbook of Cognitive Linguistics*. Oxford: Oxford University Press, 214–235.

Oded, B./Walters, J. (2001). Deeper processing for better EFL reading comprehension. *System* 29, 357–370.

Odlin, T. (2005). Cross-linguistic influence and conceptual transfer: What are the concepts? *Annual Review of Applied Linguistics* 25, 3–25.

Ohler, P./Nieding, G. (2000). Kognitive Modellierung der Textverarbeitung und der Informationssuche im World Wide Web. In: Batinic, B. (Ed.), *Internet für Psychologen*. Göttingen: Hogrefe, 219–240.

Oxford, R. L. (1990). *Language Learning Strategies. What every teacher should know*. Boston, MA: Heinle.

Oxford, R. L. (2003). *Language Learning Strategies around the World: Cross-Cultural Perspectives*. 6th Edition. Manoa: University of Hawaii Press.

Özçalışkan, Ş./Slobin, D. I. (1999). Learning 'how to search for the frog': Expression of manner of motion in English, Spanish & Turkish. In: Greenhill, A./Littlefield, H./Tano, C. (Eds.), *Pro-ceedings of the 23rd Annual Boston University Conference on Language Development*. Somerville, MA: Cascadilla, 541–552.

Paas, F. G. W. C./van Merriënboer, J. (1994). Variability of worked examples and transfer of geometrical problem solving skills: A cognitive-load approach. *Journal of Educational Psychology* 86: 1, 122–133.

Paas, F. G. W. C. (1992). Training strategies for attaining transfer of problem-solving skill in statistics: A Cognitive-Load approach. *Journal of Educational Psychology* 84, 429–434.

Paivio, A. (1990). *Mental Representations: A Dual Coding Approach. Oxford Psychology Series: Vol.9.* Oxford: Oxford University Press.

Paivio, A. (2007). *Mind and its Evolution: A Dual Coding Theoretical Approach*. Mahwah, NJ: Erlbaum.

Palinscar, A. S./Brown, A. L. (1984). Reciprocal teaching of comprehension-fostering and comprehension-monitoring activities. *Cognition and Instruction* 1: 2, 117–175.

Pape-Müller, S. (1980). *Textfunktionen des Passivs. Untersuchungen zur Verwendung von grammatisch-lexikalischen Passivformen*. Tübingen: Niemeyer.

Paradis, M. (1997). The cognitive neuropsychology of bilingualism. In: De Groot, A./Kroll, J. (Eds.), *Tutorials in Bilingualism: Psycholinguistic Perspectives*. Mahwah, NJ: Erlbaum, 331–354.

Paradis, M. (2001). Bilingual and polyglot aphasia. In: Berndt, R. S. (Ed.), *Handbook of Neuropsychology*, 2nd Edition, Vol. Language and Aphasia. Amsterdam: Elsevier Science, 69–91.

Paradis, M. (2003). The bilingual Loch Ness Monster raises its nonasymmetric head again – or, why bother with such cumbersome notions as validity and reliability? Comments on Evans et al. (2002). *Brain and Language* 87, 441–448.

Paradis, M. (2007). L1 attrition features predicted by a neurolinguistic theory of bilingualism. In: Koepke, B./Schmid, M. S./Keijzer, M./Dostert, S. (Eds.), *Language Attrition: Theoretical Perspectives*. The Netherlands: John Benjamins Publishing, 121–133.

Paris, S. G./Cross, D. R./Lipson, M. Y. (1984). Informed strategies for learning: A program to improve children's reading awareness and comprehension. *Journal of Educational Psychology* 76: 6, 39–52.

Pavlenko, A. (2009). Conceptual representation in the bilingual lexicon and second language vocabulary learning. In: Pavlenko, A. (Ed.) *The Bilingual Mental Lexicon: Interdisciplinary Approaches*. Clevedon, UK: Multilingual Matters, 125–160.

Pawley, A./Syder, F. (1983). Two puzzles for linguistic theory: Nativelike selection and nativelike fluency. In: Richards, J. C./Schmidt, R. W. (Eds.), *Language and Communication*. New York: Longman, 191–226.

Penke, M. (2006). *Flexion im mentalen Lexikon*. Tübingen: Niemeyer

Perfetti, C. A./Dunlap, S. (2008), Learning to read: General principles and writing system variations. In: Koda, K./Zehler, A. M. (Eds.), *Learning to Read Across Languages*. Mahwah, NJ: Erlbaum, 13–38.

Perfetti, C. A./Hart, L. (2001). The lexical bases of comprehension skill. In: Gorfien, D. S. (Ed.), *On the Consequences of Meaning Selection*. Washington DC: American Psychological Association, 67–86.

Perfetti, C. A. (2011). Phonology is critical in reading: but a phonological deficit is not the only source of low reading skill. In: Brady, S. A./Braze, D./Fowler, C. A. (Eds.), *Explaining Individual Differences in Reading: Theory and Evidence*. New York/Hove: Psychology Press, 163–171.

Piaget, J. (1976): Piaget's Theory. In: Inhelder, B. (Ed.), *Piaget and his School*. New York: Springer, 11–23.

Pickering, M. J./Clifton, C./Crocker, M. W. (2000). Architectures and mechanisms in sentence. In: Crocker, M. W./Pickering, M./Clifton, C. (Eds.), *Architectures and Mechamisms for Language Processing*. New York: Univ. Press, 1–30.

Pintrich, P. R. (2000). The role of goal orientation in self-regulated learning. In: Boekaerts, M./Pintrich, P. R./Zeidner, M. (Eds.), *Handbook of self-regulation*. San Diego: Academic Press, 451–502.

Piquer Píriz, A. M. (2008). Reasoning figuratively in early EFL: Some implications for the development of vocabulary. In: Boers, F./Lindstromberg, S. (Eds.), *Cognitive Linguistic Approaches to Teaching Vocabulary and Phraseology*. Amsterdam: Mouton de Gruyter, 219–240.

Plass, J. L./Kalyuga, S./Leutner, D. (2010). Individual differences and cognitive load theory. In: Plass, J. L./Moreno, R./Brünken, R. (Eds.), *Cognitive Load Theory*. Cambridge, New York: Cambridge University Press, 65–90.

Plass, J./L./Jones, L. C. (2005). Multimedia Learning in second language acquisition. In: Mayer, R. E. (Ed.), *The Cambridge Handbook of Multimedia Learning*. Cambridge: Cambridge University Press, 467–488.

Plaut, D. C./McClelland, J. L./Seidenberg, M. S./Patterson, K. (1996). Understanding normal and impaired word reading: Computational principles in quasi-regular domains. *Psychological Review* 103, 56–115.

Plieger, P. (2006). *Struktur und Erwerb des bilingualen Lexikons. Konzepte für die mediengestützte Wortschatzarbeit*. Berlin: LIT Verlag.

Plötzner, R./Härder, J. (2001). Unterstützung der Verarbeitung externer Repräsentationen am Beispiel des Lernens mit Hypertexten. *Unterrichtswissenschaft* 29: 4, 367–384.

Politzer, R. L. (1961). The Impact of Linguistics on Language Teaching: Past, Present and Future. *Modern Language Journal* 48: 3, 146–151.

Potelle, H./Rouet, J.-F. (2003). Effects of content representation and readers' prior knowledge on the comprehension of hypertext. *International Journal of Human-Computer Studies* 58, 327–345.

Poulisse, N. (1993). A theoretical account of lexical communication strategies. In: Schreuder, R./Weltens, B. (Eds.), *The Bilingual Lexicon*. Amsterdam: John Benjamins, 157–189.

Pracht, H. (2010). *Alphabetisierung in der Zweitsprache Deutsch als Schemabildungsprozess: Bedingungsfaktoren der Schemaetablierung und -verwendung auf der Grundlage der »usage-based theory«*. Münster: Waxmann.

Pracht, H. (2012). *Schemabasierte Basisalphabetisierung im Deutschen. Ein Praxisbuch für Lehrkräfte*. Münster et al.: Waxmann.

Pressley, M./Wharton-McDonald, R. (1997). Skilled comprehension and its development through instruction. *School Psychology Review* 26: 3, 448–66.

Price, C. J. (2010). The anatomy of language: a review of 100 fMRI studies published in 2009. *Annals of the New York Academy of Sciences* 1191: 62–88.

Prodeau, M. (2005). Gender and number in French L2: can we find out more about the constraints on production in L2? In: Dewaele, J.-M. (Ed.), *Focus on French as a Foreign Language: Multidisciplinary Approaches*. Clevedon: Multilingual Matters, 114–34.

Pujadas Jorba, G./Muñoz Lahoz, C. (2019). *Extensive viewing of captioned and subtitled TV series: a study of L2 vocabulary learning adolescents*. London: Taylor and Francis.

Puntambekar, S. (1995). Helping students learn 'how to learn' from texts: Towards an IST for developing metacognition. *Instructional Science* 23, 163–182.

Puntambekar, S./Stylianou, A./Hübscher, R. (2003). Improving navigation and learning in hypertext environments with navigable concept maps. *Human-Computer Interaction* 18, 395–428.

Rabab'ah, G./Bulut, D. (2007). Compensatory strategies in Arabic as a second language. *Poznan Studies in Contemporary Linguistics* 43: 2, 83–106.

Radden, G./Dirven, R. (2007). Cognitive English Grammar. Amsterdam: John Benjamins Pub.

Radden, G. (2008). The cognitive approach to language. In: Andor, J./Hollósy, B./Laczkó, T./Pelyvás, P. (Eds.), *When Grammar Minds Language and Literature: Festschrift for Prof. Béla Korponay on the Occasion of his 80th Birthday*. Debrecen: Institute of English and American Studies, 387–412.

Radden, G. (2009). Affirmative and negated modality. *New Perspectives in Cognitive Linguistics Quaderns de Filologia: Estudis Lingüístics* 14, 169–192.

Radden, G. (2011). Spatial time in the West and the East. In: Brdar, M./Omazic, M./Takac, Visna P./Gradecak-Erdeljic, T./Buljan, G. (Eds.), *Space and Time in Language*. Frankfurt et al.: Peter Lang, 1–40.

Randi, J./Corno, L. (2000). Teacher innovations in self-regulated learning. In: Boekaerts, M./Pintrich, P. R./Zeidner, M./Royer, J. M. (Eds.), *Handbook of Self-Regulation*. San Diego: Academic Press, 651–685.

Rauh, G. (1991). *Approaches to Prepositions*. Tübingen: Gunter Narr.

Rawson, K. A. (2007). Testing the shared resource assumption in theories of text processing. *Cognitive Psychology* 54: 2, 155–183.

Rayner, K./Pacht, J. M./Duffy, S. A. (1994). Effects of prior encounter and discourse bias on the processing of lexically ambiguous words. *Journal of Memory and Language* 33, 527–44.

Reichenbach, H. (1947). *Elements of Symbolic Logic*. Berkeley: University of California Press.

Reicher, G. M. (1969). Perceptual recognition as a function of meaningfulness of stimulus material. *Journal of Experimental Psychology* 81, 274–280.

Reif, M. (2012). *Making Progress Simpler? Applying Cognitive Grammar to Tense-Aspect Teaching*. Frankfurt am Main: Peter Lang.

Reinmann-Rothmeier, G./Mandl, H. (2006). Unterrichten und Lernumgebungen gestalten. In: Krapp, A./Weidenmann, B. (Eds.), *Pädagogische Psychologie. Ein Lehrbuch* (5. Aufl.). Weinheim: Beltz, 613–658.

Reisslein, J./Atkinson, R. K./Seeling, P./Reisslein, P. (2006). Encountering the expertise reversal effect with a computer-based environment on electrical circuit analysis. *Learning and Instruction* 16: 2, 92–103.

Renkl, A. (2005). The worked-out examples principle in multimedia learning. In: Mayer, R. E. (Ed.), The Cambridge Handbook of Multimedia Learning. Cambridge: Cambridge University Press, 229–246.

Repetto, L. P./Jasmin, E./Fombonne, E./Gisel, E./Couture, M. (2017). Longitudinal Study of Sensory Features in Children with Autism Spectrum Disorder.

Richter, T./Christmann, U. (2002). Lesekompetenz: Prozessebenen und interindividuelle Unterschiede. In: Groeben, N./Hurrelmann, B. (Eds.): *Lesekompetenz – Bedingungen, Dimensionen, Funktionen*. Weinheim: Juventa Verlag, 25–58.

Richter, T./Naumann, J./Brunner, M./Christmann, U. (2005). Strategische Verarbeitung beim Lernen mit Text und Hypertext. *Zeitschrift für pädagogische Psychologie* 19: 1/2, 5–22.

Rickheit, G./Strohner, H. (2003). Inferenzen. In: Rickheit, G./Herrmann, T./Deutsch, W. (Eds.), *Psycholinguistik. Ein internationales Handbuch. Handbücher zur Sprach- und Kommunikationswissenschaft*. Berlin: de Gruyter, 566–576.

Rickheit, G./Schnotz, W./Strohner, H. (1985). The concept of inference in discourse comprehension. In: Rickheit, G./Strohner, H. (Eds.), *Inferences in Text Processing*. Amsterdam: North Holland, 3–49.

Roberson, D. (2005). Color categories are culturally diverse in cognition as well as in language. *Cross-Cultural Research* 39, 56–71.

Robinson, P./Ellis, N. (2008). *Handbook of Cognitive Linguistics and Second Language Acquisition*. London: Routledge.

Roche, J./Roussy-Parent, M. (2006). Zur Rolle der kontrastiven Semantik in interkultureller Kommunikation. *Fremdsprachen Lehren und Lernen* 36, 228–250.

Roche, J./Scheller, J. (2008). Grammar animations and cognitive theory of multimedia learning. In: Barber, B./Zhang, F. (Eds.), *Handbook of Research on Computer Enhanced Language Acquisition and Learning*. Hershey, PA: Information Science Reference, 205–219.

Roche, J./Suñer Muñoz, F. (2014). Kognition und Grammatik: Ein kognitionswissenschaftlicher Ansatz zur Grammatikvermittlung am Beispiel der Grammatikanimationen. *Zeitschrift für Interkulturellen Fremdsprachenunterricht* 19: 2, 119–145

Roche, J./Suñer Muñoz, F. (2016). Metaphors and grammar teaching. *Yearbook of the German Cognitive Linguistics Association* 4: 1, 89–112.

Roche, J./Suñer Muñoz, F. (2019). Multimediales Lerndesign. In: Roche, J. (Ed.), *Medienwissenschaft und Mediendidaktik*. Tübingen: Narr, 18–29.

Roche, J./Terrasi-Haufe, E. (2016). *DaF/DaZ-Schüler im Regelunterricht fördern*. Augsburg: Auer.

Roche, J./Webber, M. J. (1995). *Für- und Wider-Sprüche. Ein integriertes Text-Buch für Colleges und Universitäten*. (Kombiniertes Lehr- und Arbeitsbuch mit didaktischen und methodischen Kommentaren für Lehrer und Lerner, eine Kassette). New Haven: Yale University Press.

Roche, J. (2001). *Interkulturelle Sprachdidaktik. Eine Einführung*. Tübingen: Narr.

Roche, J. (2006). Textkompetenz als Aufgabe in Fremdsprachenerwerb und -unterricht. In: Bausch, K.-R./Burwitz-Melzer, E./Königs, F./Krumm, H.-J. (Eds.): *Aufgabenorientierung als Aufgabe. Arbeitspapiere der 26. Frühjahrskonferenz zur Erforschung des Fremdsprachenunterrichts*. Tübingen: Gunter Narr Verlag, 209–218.

Roche, J. (2007). Hypertextualität und Kognition im Fremdsprachenerwerb. In: Bausch, K.-R./Burwitz-Melzer, E./Königs, F. G./Krumm, H.-J. (Eds.), *Textkompetenzen. Arbeitspapiere der 26. Frühjahrskonferenz zur Erforschung des Fremdsprachenunterrichts*. Tübingen: Gunter Narr Verlag, 167–178.

Roche, J. (2008). *Handbuch Mediendidaktik*. München: Hueber.

Roche, J. (2013a). *Fremdsprachenerwerb, Fremdsprachendidaktik*. Tübingen: Francke.

Roche, J. (2013b). *Mehrsprachigkeitstheorie – Erwerb, Kognition, Transkulturation, Ökologie*. Tübingen: Gunter Narr Verlag.

Roche, J. (2018). Transkulturation und Transdifferenz. In: Roche, J./Venohr, E. (Eds.), *Kultur- und Literaturwissenschaften*. Tübingen: Narr, 57–88.

Roche, J./Reher, J./Simic, M. (2012). *Focus on Handlung. Zum Konzept des handlungsorientierten Erwerbs sprachlicher, sozialer und demokratischer Kompetenzen im Rahmen einer Kinder-Akademie*. Münster: Lit Verlag.

Roche, J./Reher, J./Simic, M. (2012). *Focus on Handlung. Zum Konzept des handlungsorientierten Erwerbs sprachlicher, sozialer und demokratischer Kompetenzen im Rahmen einer Kinder-Akademie*. Münster: Lit Verlag.

Rodríguez Cervantes, C. A./Roux Rodríguez, R. (2012). The use of communication strategies in the beginner EFL classroom. *Gist Education and Learning Research Journal* 6, 111–128.

Roll, I./Aleven, V./McLaren, B. M./Koedinger, K. R. (2011). Improving students' help-seeking skills using metacognitive feedback in an intelligent tutoring system. *Learning and Instruction* 21: 2, 267–280.

Rosch, E. (1975). Cognitive representations of semantic categories. *Journal of Experimental Psychology*: General, 104: 3, 192–233.

Rosch, E. (1978). Principles of categorization. In: Rosch, E./Lloyd, B. B. (Eds.), *Cognition and Categorization*. Hillsdale, NJ: Lawrence Erlbaum, 27–48.

Rosebrock, C./Nix, D. (2008). *Grundlagen der Lesedidaktik und der systematischen schulischen Leseförderung*. Baltmannsweiler: Schneider Hohengehren.

Rosenshine, B./Meister, C./Chapman, S. (1996). Teaching students to generate questions: A review of the intervention studies. *Review of Educational Research* 66: 2, 181–221.

Rouet, J.-F./Potelle, H. (2005). Navigational principles in multimedia learning. In: Routledge, 216–236.

Rubin, J./Chamot, A. U./Harris, V./Anderson, N. J. (2007). Intervening in the use of strategies. In: Cohen, Andrew D. M. (Eds.), *Language Learner Strategies: Thirty Years of Research and Practice*. Oxford: Oxford University Press, 141–161.

Rumelhart, D. E. (1975). Notes on a schema for stories. In: Bobrow, D. G./Collins, A. (Eds.), *Representation and Understanding: Studies in Cognitive Science*. New York: Academic Press, 211–236.

Rumelhart, D. E./Smolensky, P./McClelland, J. L./Hinton, G. E. (1986). Schemata and sequential thought processes in PDP models. In: McClelland, J. L./Rumelhart, D. E./The PDP research group (Eds.), *Parallel Distributed Processing. Explorations in the Microstructure of Cognition*. Cambridge: MIT Press, 7–57.

Rummer, R./Fürstenberg, A./Schweppe, J. (2008). Lernen mit Texten und Bildern: Der Anteil akustisch-sensorischer Information am Zustandekommen des Modalitätseffekts. *Zeitschrift für pädagogische Psychologie* 22: 1, 37–45.

Sa'adeddin, M. A. A. M. (1989). Text development and Arabic-English negative interference. *Applied Linguistics* 10: 1, 36–51.

Sadoski, M./Paivio, A. (2004). A dual coding theoretical model of reading. In: Ruddell, R. B./Unrau, N. J. (Eds.), *Theoretical Models and Processes of Reading* (5th ed.). Newark, DE: International Reading Association, 1329–1362.

Salmerón, L./Baccino, T./Cañas, J. J./Madrid, R. I./Fajardo, I. (2009). Do graphical overviews facilitate or hinder comprehension in hypertext? *Computers and Education* 53, 1308–1319.

Salverda, A. P./Dahan, D./McQueen, J. M. (2003). The role of prosodic boundaries in the resolution of lexical embedding in speech comprehension. *Cognition* 90: 1, 51–89.

Savignon, S. J. (2000). Communicative language teaching. In: Byram, M. (Ed.), *Routledge Encyclopedia of Language Teaching and Learning*. London: Routledge, 125–129.

Savory, T. H. (1967). *The Language of Science: Its Groth, Character, and Usage*. London: André Deutsch.

Scheller, J. (2008). Grammatik, Kognition und Imagination. *Zeitschrift für Interkulturellen Fremdsprachenunterricht* 13: 2, 1–8.

Scheller, J. (2009). *Animationen in der Grammatikvermittlung. Multimedialer Spracherwerb am Beispiel von Wechselpräpositionen*. Berlin / Münster: Lit Verlag.

Scheller, J. (2012). Digitale Grammatikvermittlung und interkulturelles Lernen. In: Roche, J. (Eds.), *LIFE. 5. Ergänzungslieferung der LIFE-Materialien*. München: BMW Group.

Schiefele, U./Pekrun, R. (1996). Psychologische Modelle des fremdgesteuerten und selbstgesteuerten Lernens. In: Weinert, F. E. (Eds.), *Enzyklopädie der Psychologie. Pädagogische Psychologie: Bd. 2. Psychologie des Lernens und der Instruktion*. Göttingen: Hogrefe, 249–278.

Schiefele, U. (Eds.) (2004). *Struktur, Entwicklung und Förderung von Lesekompetenz: Vertiefende Analysen im Rahmen von PISA 2000* (1. Aufl.). Wiesbaden: VS Verl. für Sozialwiss.

Schmidt, C. (2006). Towards the support of cognitive flexibility in hypertext design. *Journal of Computing Sciences in Colleges* 21: 4, 35–41.

Schmidt, R. W. (1990). The role of consciousness in second language learning. *Applied Linguistics* 11, 129–158.

Schmidt, R. W. (2001). Attention. In: Robinson, Peter (Ed.), *Cognition and Second Language Instruction*. Cambridge: Cambridge University Press, 3–32.

Schmitt, N. (2008), Review article: Instructed second language vocabulary learning. *Language Teaching Research* 12: 3, 329–363.

Schmitt, N./Schmitt, D. (2014). A reassessment of frequency and vocabulary size in L2 vocabulary teaching. *Language Teaching* 47: 4, 484–503.

Schmitz, U. (2011). Sehflächenforschung. Eine Einführung. In: Diekmannshenke, H./Klemm, M./Stöckl, H. (Eds.): *Bildlinguistik. Theorien – Methoden – Fallbeispiele*. Berlin: Erich Schmidt, 23–42.

Schnitzler, C.D. (2008). *Phonologische Bewusstheit und Schriftspracherwerb*. Stuttgart: Thieme.

Schnotz, W./Bannert, M. (2003). Construction and interference in learning from multiple representation. *Learning and Instruction* 13: 2, 141–156.

Schnotz, W./Preuß, A. (1999). Task-dependent construction of mental models as a basis for conceptual change. In: Rickheit, G./Habel, C (Eds.), *Mental models in discourse processing and reasoning*. Amsterdam: Elsevier, 131–168.

Schnotz, W./Zink, T. (1997). Informationssuche und Kohärenzbildung beim Wissenserwerb mit Hypertext. *Zeitschrift für pädagogische Psychologie* 11: 2, 95–108.

Schnotz, W. (1994). *Aufbau von Wissensstrukturen: Untersuchungen zur Kohärenzbildung beim Wissenserwerb mit Texten*. Weinheim: Beltz. (Univ., Habil.-Schr.Tübingen.).

Schnotz, W. (2005). An integrated model of text and picture Comprehension. In: Mayer, R. E. (Ed.), *The Cambridge handbook of multimedia learning*. Cambridge: Cambridge Univ. Press, 49–70.

Schnotz, W. (2006). Was geschieht im Kopf des Lesers? Mentale Konstruktionsprozesse beim Textverstehen aus der Sicht der Psychologie und kognitiven Linguistik. In: Blühdorn, H./Breindl, E. (Eds.), *Text – Verstehen: Grammatik und darüber hinaus*. Berlin: de Gruyter, 222–23.

Schoenthal, G. (1975). *Das Passiv in der deutschen Standardsprache. Darstellung in der neueren Grammatiktheorie und Verwendung in gesprochener Sprache*. München: Hueber.

Scholz, S./Eisenlauer, V. (2008). Hypertextualität als Interpretament der Bibel und ihrer Auslegung. In: Wischmeyer, O. (Ed.), *Neutestamentliche Entwürfe zur Theologie: Vol. 14. Die Bibel als Text. Beiträge zu einer textbezogenen Bibelhermeneutik*. Tübingen: Francke, 69–96.

Schönefeld, D. (2006). From conceptualization to linguistic expression: Where languages diversify. In: Gries, S. Th./Stefanowitsch, A. (Eds.), *Corpora in Cognitive Linguistics. Corpus- Based Approaches to Syntax and Lexis*. Berlin: Mouton de Gruyter, 297–344.

Schraw, G. (2001). Promoting general metacognitive awareness. In: Hartman, H. J. (Ed.), *Metacognition in learning and instruction. Theory, research and practice*. Dordrecht: Kluwer Academic Publishers, 3–16.

Schulmeister, R. (2007). *Grundlagen hypermedialer Lernsysteme: Theorie – Didaktik – Design*. München: Oldenbourg.

Schwartz, B. L. (2002). *Tip-of-the-Tongue states: Phenomenology, Mechanism, and Lexical Retrieval*. Hillsdale, NJ: Erlbaum.

Searle, J. (1979). Metaphor. In: Ortony, A. (Ed.), *Metaphor and Thought*. Cambridge: Cambridge University Press.

Seel, N. M. (2000). *Psychologie des Lernens. Lehrbuch für Pädagogen und Psychologen*. München/Basel: Reinhardt.

Seel, N. M. (2003). *Psychologie des Lernens*. München: Reinhardt.

Seel, N. M. (2008). Empirical perspectives on memory and motivation. In: Spector, J. M./Driscoll, M. P./Merrill, M. D./van Merriënboer, J. J. G. (Eds.), *Handbook of Research on Educational Communications and Technology* (3rd ed.). Mahwah, NJ: Lawrence Erlbaum, 39–54.

Seel, N. M./Darabi, A. A./Nelson, D. W. (2006). A dynamic mental model approach to examine schema development in performing a complex troubleshooting task: Retention of mental models. *Technology, Instruction, Cognition and Learning* 4: 3–4, 303–329.

Serra Borneto, C. (1995). 'Liegen' and 'stehen' in German: A study in horizontality and verticality. In: Casad, E. H. (Ed.), *Cognitive Linguistics in the Redwoods: The Expansion of a New Paradigm in Linguistics*. Berlin, New York: Mouton de Gruyter, 459–505.

Serra Borneto, C. (1996). Polarity and metaphor in German. In: Pütz, M./Dirven, R. (Eds.), *The Construal of Space in Language and Thought*, Berlin, New York: Mouton de Gruyter, 373–394.

Seufert, T./Brünken, R. (2006). Cognitive load and the format of instructional aids for coherence formation. *Applied Cognitive Psychology* 20: 3, 321–331.

Seymour, P. (2006). Theoretical framework for beginning reading in different orthographies. In: Joshi, M./Aaron, P. G. (Eds.), *Handbook of Orthography and Literacy*. Mahwah: Lawrence Erlbaum Associates, 441–462.

Simons, P. R.-J./De Jong, F. P. (1992). Self-regulation and computer-aided instruction. *Applied Psychology* 41: 4, 333–346.

Simons, P. R.-J. (1992). Lernen, selbständig zu lernen – ein Rahmenmodell. In: Mandl, H./Friedrich, H.-F. (Eds.), *Lern und Denkstrategien – Analyse und Intervention*. Göttingen: Hogrefe, 251–264.

Sims, V. K./Hegarty, M. (1997). Mental animation in the visuospatial sketchpad: Evidence from dual-task studies. *Memory and Cognition* 25: 3, 321–332.

Sitzmann, T./Ely, K. (2010). Sometimes you need a reminder: The effects of prompting self-regulation on regulatory processes, learning, and attrition. *The Journal of Applied Psychology* 95: 1, 132–144.

Sitzmann, T./Bell, B. S./Kraiger, K./Kanar, A. M. (2009). A multilevel analysis of the effect of prompting self-regulation in technology-delivered instruction. *Personnel Psychology* 62: 4, 697–734.

Skoufaki, S. (2008). Conceptual metaphoric meaning clues in two idiom presentation Methods. In: Boers, F./Lindstromberg, S. (Eds.), *Cognitive Linguistic Approaches to Teaching Vocabulary and Phraseology*. Amsterdam: Mouton de Gruyter, 101–132.

Skulmowski, A./Rey, G. D. (2018). Embodied learning: Introducing a taxonomy based on bodily engagement and task integration. *Cognitive Research: Principles and Implications*, 3 (1), 1–10.

Slobin, D. I. (1996). From thought and language to thinking for speaking. In: Gumperz, J. J./Levinson, S. C. (Eds.), *Rethinking Linguistic Relativity. Studies in the Social and Cultural Foundations of Language 17*. Cambridge: Cambridge University Press, 70–96.

Slobin, D. I. (2003). Language and thought online: Cognitive consequences of linguistic relativity. In: Gentner, D./Goldin-Meadows, S. (Eds.), *Language in Mind: Advances in the Study of Language and Thought*. Cambridge, MA: MIT Press, 157–192.

Smirnova, E./Mortelmans, T. (2010). *Funktionale Grammatik: Konzepte und Theorien*. Berlin/New York: de Gruyter.

Smith, B. (2003). The use of communication strategies in computer-mediated communication. *System* 31, 29–53.

Smith, F. (1978). *Understanding Reading: A Psycholinguistic Analysis of Reading and Learning to Read*. New York: Holt Rinehart and Winston.

Smith, M. (2002). The polysemy of German es, iconicity, and the notion of conceptual distance. *Cognitive Linguistics* 13: 1, 67–112.

Sohrabi, P. (2012). *Strategisches Lesen lernen für die Rezeption fremdsprachiger Hypertextstrukturen*. Tübingen: Gunter Narr.

Spalek, K. (2010). Wortproduktion. In: Höhle, B. (Eds.), *Psycholinguistik*. Berlin: Akademie Verlag, 53–66.

Spinelli, E., McQueen, J. M./Cutler, A. (2003). Processing resyllabified words in French. *Journal of Memory and Language* 48: 2, 233–254.

Spiro, R. J./Coulson, R. L./Feltovich, P. J./Anderson, D. K. (1988). Cognitive flexibility theory: advanced knowledge acquisition in ill-structured domains. In: Patel, V. L. (Ed.), *Program of the Tenth Annual Conference of the Cognitive Science Society: Vol. 10*. Hillsdale, N. J.: Erlbaum, 375–383.

Stark, R./Krause, U.-M. (2009). Effects of reflection prompts on learning outcomes and learning behavior in statistics education. *Learning Environments Research* 12: 3, 209–223.

Steels, L. (2003). Evolving grounded communication for robots. Trends in Cognitive Science 7: 7, 308–312.

Stevenson, M./Schoonen, R./Glopper de, K. (2007). Inhibition or compensation? A multidimensional comparison of reading processes in Dutch and English. *Language Learning* 57: 1, 115–154.

Stork, A. (2003). *Vokabellernen. Eine Untersuchung zur Effizienz von Vokabellernstrategien*. Tübingen: Gunter Narr.

Storrer, A. (2002). Coherence in text and hypertext. *Document Design* 3: 2, 156–168.

Storrer, A. (2008). Hypertextlinguistik. In: Janich, N. (Ed.), *Textlinguistik. 15 Einführungen*. Tübingen: Narr, 211–227.

Strohner, H. (2003). Parsing-Prozesse. In: Rickheit, G./Herrmann, T./Deutsch, W. (Eds.), *Handbücher zur Sprach- und Kommunikationswissenschaft. Psycholinguistik. Ein internationales Handbuch*. Berlin: de Gruyter, 524–531.

Strzebkowski, R. (2006). *Selbständiges Lernen mit Multimedia in der Berufsausbildung. Mediendidaktische Gestaltungsaspekte interaktiver Lernsysteme*. Berlin: Dissertation.

Stutterheim, C. von (2003). Linguistic structures and information organisation. The case of very advanced learners. In: Foster-Cohen, S. (Ed.), *EUROSLA. Yearbook 3*. Amsterdam: Benjamin, 183–206.

Sumfleth, E./Neuroth, J./Leutner, D. (2010). Concept Mapping – eine Lernstrategie muss man lernen. *Chemkon* 17: 2, 66–70.

Suñer Muñoz, F. (2011). *Hypertexte im L2-Spracherwerb. Zur Relevanz des Multimedia- und Modalitätsprinzips im L2-Spracherwerb am Beispiel des Einsatzes graphischer Übersichten in Hypertexten*. Lit Verlag: Münster.

Suñer Muñoz, F. (2013). Bildhaftigkeit und Metaphorisierung in der Grammatikvermittlung am Beispiel der Passivkonstruktion. *Zeitschrift für interkulturellen Fremdsprachenunterricht* 18: 1, 4–20.

Suñer Muñoz, F. (2015). Metaphern und Grammatikvermittlung am Beispiel der Passivkonstruktion. In: Baumann, B./Sohrabi, P./Hoffmann, S. (Eds.), *IDT 2013 / 2/1 Kognition, Sprache, Musik*. Bozen: Bozen University Press, 137–156.

Suñer Muñoz, F./Roche, J. (2019): Embodiment in concept-based L2 grammar teaching: The case of German light verb constructions. *International Review of Applied Linguistics in Language Teaching*, 1–27.

Suñer Muñoz, F./Springer, M. (2012). Geschichte und Hypertexte im interkulturellen Fremdsprachenunterricht. In: Roche, J. (Ed.), *LIFE. 5. Ergänzungslieferung der LIFE-Materialien*. München: BMW Group.

Sweetser, E. (1990). *From Etymology to Pragmatics: Metaphorical and Cultural Aspects of Semantic Structure*. Cambridge: Cambridge University Press.

Sweller, J./Chandler, P. (1991). Evidence for cognitive load theory. *Cognition and Instruction* 8: 4, 351–362.

Sweller, J./Chandler, P. (1994). Why Some Material Is Difficult to Learn. *Cognition and Instruction* 12: 3, 185–233.

Sweller, J. (1988). Cognitive load during problem solving: Effects on learning. *Cognitive Science* 12, 257–285.

Sweller, J. (2004). Instructional Design Consequences of an Analogy between Evolution by Natural Selection and Human Cognitive Architecture. *Instructional Science* 32, 9–31.

Sweller, J. (2005). Implications of cognitive load theory for multimedia learning. In: Mayer, Richard E. (Ed.), *The Cambridge Handbook of Multimedia Learning*. Cambridge: Cambridge University Press, 19–30.

Sweller, J./van Merriënboer, J. J. G./Paas, F. G. W. C. (1998). Cognitive architecture and instructional design. *Educational Psychology Review* 10: 3, 251–296.

Sylla, B. (1999). Zum Problem der Kasuswahl nach Wechselpräpositionen. *Deutsch als Fremdsprache* 36: 3, 150–155.

Taatgen, N./Anderson, J. R. (2008). Constraints in cognitive architectures. In: Sun, R. (Ed.), *The Cambridge handbook of computational psychology*. Cambridge: Cambridge Univ. Press, 170–185.

Tabbers, H./Martens, R./van Merriënboer, J. J. G. (2000). Multimedia instructions and cognitive load theory: split-attention and modality effects. *Paper presented at the National Convention of the Association for Educational 2000 in Long Beach, California*.

Takahashi, S. (2010). Assessing learnability in second language pragmatics. In: Trosborg, A. (Ed.), *Pragmatics across Languages and Cultures*. Berlin/Germany: Mouton de Gruyter, 391–421.

Talmy, L. (1983). How language structures space. In: Pick, H./Acredolo, L. P. (Eds.), *Spatial orientation: Theory, research, and application*. New York: Plenum Press, 225–282.

Talmy, L. (2000). *Toward a Cognitive Semantics. Vol. 1: Concept Structuring Systems*. Cambridge: MIT Press.

Talmy, L. (2008). Aspects on language attention. In: Robinson, P./Ellis, N. (Eds.), *Handbook of Cognitive Linguistics and Second Language Acquisition*. New York: Routledge, 27–38.

Tang, E./Nesi, H. (2003). Teaching vocabulary in two Chinese classrooms: Schoolchildren's exposure to English words in Hong Kong and Guangzhou. *Language Teaching Research* 7: 1, 65–97.

Tapiero, I./Kintsch, W. (2007). *Situation models and levels of coherence: Toward a definition of comprehension*. Mahwah, N. J.: Lawrence Erlbaum Associates.

Tergan, S.-O. (2002). Hypertext und Hypermedia: Konzeption, Lernmöglichkeiten, Lernprobleme und Perspektiven. In Issing, L. J./Klimsa, P. (Hrsg), *Information und Lernen mit Multimedia und Internet. Lehrbuch für Studium und Praxis*. Weinheim: Beltz PVU.

Tergan, S.-O. (2005). Digital concept maps for managing knowledge and information. In: Tergan, S.-O./Keller, T. (Eds.), *Knowledge and Information Visualization. Searching for Synergies*. Berlin/Heidelberg: Springer. 185–204.

Tindall-Ford, S. K./Chandler, P./Sweller, J. (1997). When two sensory modes are better than one. *Journal of Experimental Psychology: Applied* 3: 4, 257–287

Tomasello, M. (2003). *Constructing a Language. A Usage-Based Theory of Language Acquisition*. Cambridge, Mass: Harvard University Press.

Tomasello, M. (2006). Acquiring linguistic constructions. In: Kuhn, D./Siegler, R. (Eds.), *Handbook of Child Psychology. Cognition, Perception, and Language*. Vol. 2. New York: Wiley, 256–298.

Tönshoff, W. (2007). Lernerstrategien. In: Bausch, K.-R./Christ, H./Krumm, H.-J. (Eds.), *Handbuch Fremdsprachenunterricht*. Tübingen: Francke, 331–335.

Treichel, B. (1996). *Die linguistische Analyse autobiographischen Erzählens in Interviews und die Anwendung narrationsanalytischer Erkenntnisse auf Probleme von Studienkarrieren*. Tübingen: Narr. (Univ., Dissertation Kassel, 1995).

Tyler, A. (2008). Cognitive linguistics and second language instruction. In Robinson, P./Ellis, N. C. (Eds.), *Handbook of Cognitive Linguistics and Second Language Acquisition*. New York: Routledge, 456–488.

Tyler, A. (2012). Cognitive linguistics and SLA. In: Peter Robinson (Ed.), *Routledge Encyclopedia of Eecond Language Acquisition.* London & New York: Routledge, 88–90.

Tyler, L. K./Marslen-Wilson, W. D. (1977). The on-line effects of semantic context on syntactic processing. *Journal of Verbal Learning & Verbal Behavior* 16, 683–692.

Tyler, A. Mueller, C. M./Ho, V. (2011). Applying cognitive linguistics to learning the semantics of English to, for and at: An experimental investigation. *Vial* 8, 181–205.

Unz, D. (2000). *Lernen mit Hypertext: Informationssuche und Navigation*. Münster: Waxmann

Vater, H. (2007). *Einführung in die Zeit-Linguistik*. Trier: WVT.

Veenman, M. V. (1993). *Metacognitive Ability and Metacognitive Skill: Determinants of Discovery Learning in Computeriezed Learning Environments*. Amsterdam: University of Amsterdam.

Veenman, M. V. (2005). The assessment of metacognitive skills: What can be learned from multi-method designs? In: Artelt, C./Moschner, B. (Eds.), *Lernstrategien und Metakognition: Implikationen für Forschung und Praxis*. Münster: Waxmann, 77–99.

Verhoeven, L./Perfetti, C. A. (2011). Morphological processing in reading acquisition: A cross-linguistic perspective. *Applied Psycholinguistics* 32, 457–466.

Verhoeven, L./Schreuder, R./Haarman, V. (2006). Prefix identification in the reading of Dutch bisyllabic words. *Reading and Writing* 19, 651–668.

Verspoor, M./Lowie, W. (2003). Making sense of polysemous words. *Language Learning* 53: 3, 547–586.

Vieira, S. (2011). Learning phrasal verbs through image schemas: a new approach. *Anais do VIII Congresso Internacional ABRALIN – Curitiba 2011*, 3967–3976.

Vihman, M./Croft, W. (2013). Phonological development: toward a "radical" templatic phonology. In: Vihman, M./Keren-Portnoy, T. (Eds.), *The Emergence of Phonology: Whole Word Approaches, Cross-Linguistic Evidence*. Cambridge: Cambridge University Press, 17–58.

Vinckel-Roisin, H. (2011). Wortstellungsvariation und Salienz von Diskursreferenten: Die Besetzung des Nachfeldes in deutschen Pressetexten als kohärenzstiftendes Mittel. *Zeitschrift für germanistische Linguistik* 39: 3, 377–404.

Vingerhoets, G./Van Borsel, J./Tesink, C./Van den Noort, M./Deblaere, K./Seurinck, R./Vandemaele, P./Achten, E. (2003). Multilingualism: An fMRI study. *NeuroImage* 20, 2181–2196.

Vygotskij, L. S. (1962). *Thought and language*. Cambridge: MIT Press.

Walczyk, J. J. (1995). Testing a compensatory-encoding model. *Reading Research Quarterly* 30: 3, 396–408.

Walczyk, J. J. (2000). The interplay between automatic and control process in reading. *Reading Research Quarterly* 35, 554–566.

Walczyk, J. J./Wei, M./Grifith-Ross, D. A./Goubert, S. E./Cooper, A. L./Zha, P. (2007). Development of the interplay between automatic processes and cognitive resources in reading. *Journal of Educational Psychology* 99: 4, 867–887.

Walhout, J./Brand-Gruwel, S./Jarodzka, H./Kirschner, P. (2015). Learning and navigating in hypertext: Navigational support by hierarchical menu or tag cloud? *Computers in Human Behavior* 46, 218–227.

Ward, M./Sweller, J. (1990). Structuring effective worked examples. *Cognition and Instruction* 7: 1, 1–39.

Wardhaugh, R. (1970). The contrastive analysis hypothesis. *TESOL Quarterly* 4:2, 123–130.

Ware, C. (2005). Visual queries: The foundation of visual thinking. In: Tergan, S.-O./Keller, T. (Eds.), *Knowledge and Information Visualization. Searching for Synergies*. Berlin/Heidelberg: Springer, 27–35.

Waring, R./Tataki, M. (2003). At what rate do learners learn and retain new vocabulary from reading a graded reader? *Reading in a Foreign Language* 15, 1–27.

Wartenburger, I. (2010). Mehrsprachigkeit. In: Höhle, B. (Ed.), *Psycholinguistik*. Berlin: Akademie Verlag, 173–181

Webber, M. J. (2020). Algonquin Park. Eine sehr persönliche (Ein-)Führung. San Francisco.

Webb, S. (2007). The effects of repetition on vocabulary knowledge. *Applied Linguistics* 28, 46–65.

Webb, S. (2008). The effects of context on incidental vocabulary learning. *Reading in a Foreign Language* 20: 2, 232–245.

Wedeles, L. (1965). Prof. Nelson talk analyzes P. R. I. D. E. *Vassar Miscellany News*, 03. 02. 1965, 3–4.

Weinert, F. E. (1996). Lerntheorien und Instruktionsmodelle. In: Weinert, Franz E. (Eds.), *Enzyklopädie der Psychologie. Pädagogische Psychologie: Bd. 2. Psychologie des Lernens und der Instruktion*. Göttingen: Hogrefe, 1–48.

Weinrich H. (1976). Sprache in Texten. Stuttgart: Klett.

Weinrich H. (1971). Literatur für Leser. Essays und Aufsätze zur Literaturwissenschaft. Stuttgart: Kohlhammer.

Zelinksky-Wibbelt, C. (1993), *The Semantics of Prepositions: From Mental Processing to Natural Language Processing*. Berlin: Mouton de Gruyter.

Ziegler, J. C./Ferrand, L./Jacobs, A./Rey, A./Grainger, J. (2000). Visual and phonological codes in letter and word recognition: evidence from incremental priming. *Quarterly Journal of Experimental Psychology Section A: Human Experimental Psychology* 53: 3, 671–692.

Ziegler, J. C./Jacobs A. M./Klueppel D. (2001). Pseudohomophone effects in lexical decision: still a challenge for current word recognition models. *Journal of Experimental Psychology: Human Perception and Performance* 27, 547–559.

Ziem, A./Lasch, A. (2013). *Konstruktionsgrammatik. Konzepte und Grundlagen gebrauchsbasierter Ansätze*. Berlin: de Gruyter.

Zimmerman, B. J. (2008). Investigating self-regulation and motivation: Historical background, methodological developments, and future prospects. *American Educational Research Journal* 45, 166–183.

Zlatev, J. (2005). What's in a schema? Bodily mimesis and the grounding of language. In: Hampe, B. (Ed.), *From Perception to Meaning – Image Schemas in Cognitive Linguistic*. Berlin: De Gruyter, 313–343.

Zumbach, J./Rapp, A. (2001). Wissenserwerb mit Hypermedien: Kognitive Prozesse der Informationsverarbeitung. *Osnabrücker Beiträge zur Sprachtheorie* 63, 27–44.

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