Jörg Roche, Moiken Jessen (Eds.)

Applied Cognitive Linguistics
for Language Teachers

Transkulturelle Kommunikation

herausgegeben von

Prof. Dr. Jörg Roche
(Universität München)

Band 13

LIT

Applied Cognitive Linguistics for Language Teachers

Edited by

Jörg Roche and Moiken Jessen

LIT

This book is printed on acid-free paper.

Content

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 Models of language, too, are often outdated as they focus largely on abstract structural features.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. The present volume portrays the foundations of cognitive linguistics as they contribute to the said paradigm shift in language teaching and learning. Most chapters comprise 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 1 (*Language Learning and Cognition*) 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. 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.

This volume has been translated and adapted from German (Jessen, M./Blomberg, J./Roche, J. (Eds.) (2018). *Kognitive Linguistik.* Tübingen: Narr Francke Attempto).

A dynamic online dictionary 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-resources, 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 programs on the MA level or used for professional development purposes.

Introduction

Intercultural Communication in the Age of Globalization

Communication between different cultures is one of the most important social, political, and economical 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, 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 see the early approach to 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. 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 program. 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 neighboring 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.

1   Introduction to Cognitive Linguistics

As all theoretical perspectives in linguistics, cognitive linguistics aims to answer what natural language is and how it works. In contrast to many other traditions in linguistics, cognitive linguistics is less of a ready-made paradigm and more of a particular outlook and approach to language. We could even use one of its own concepts to say that cognitive linguistics is **polysemous**. As we shall see, there are different models and accounts associated with different methods and with an interest in different aspects of language. It is for this reason that cognitive linguistics has been described as a "movement" or an "enterprise" (Evans/Green 2006: 3). To already in the first paragraph give yet another important concept of cognitive linguistics, we could **metaphorically** say that cognitive linguistics is an archipelago (Figure 1.1). It consists of several islands of linguistic theories that are unified by certain believes and premises (Geeraerts 2006: 3). The different islands do have some crucial aspects in common. Perhaps the most important one is the attempt to explain observable linguistic phenomena – like grammar – in terms of general cognitive, perceptual, and bodily skills – like the ability to categorize – which are not restricted to language.

Since many of these ideas remain quite abstract unless related to concrete, everyday situations and uses of language, we have chosen to use a lot of examples in this chapter to help illustrate how cognitive linguistics thinks about language, and the ways in which it differs from other traditions in linguistics. Students and language teachers can expect to learn a lot about linguistic theories and will hopefully feel inspired to explain language and its use in the light of a cognitive linguistic outlook.

1.1 The Basics of Cognitive Linguistics

Johan Blomberg & Moiken Jessen

We would like to think of this book as a journey through the multifaceted and polysemous archipelago of cognitive linguistics. In this chapter, we provide some of the equipment we believe is necessary to undertake such a trip. We might not visit all locations on all islands, but we hope to provide a comprehensive view of the various vistas in the rich archipelago of cognitive linguistics. We begin with this introductory chapter where we present some of the most important concepts and theoretical claims in cognitive linguistics, placed against the background of other traditions in linguistics. Chapter 1.1 makes you reflect on some basic properties of language as seen as intrinsically based in meaning. Chapter 1.2 will introduce you to some fundamental concepts of cognitive linguistics and make you acquainted with how language is analyzed. Chapter 1.3 introduces some of the basic theoretical concepts in cognitive linguistics, for instance the claim that language knowledge and meaning derive from basic perceptual and bodily capacities that we share as human beings. We link these ideas to scientific studies that set out to find evidence.
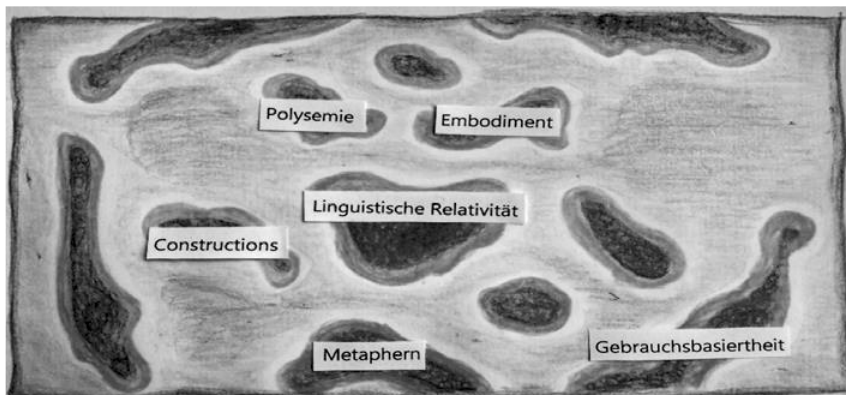
Figure 1.1: Cognitive linguistics consists of many different research areas that are united by basic assumptions about the nature of language (own illustration)

Study Goals

This chapter will enable you to:

- – understand the basic ideas and concepts in cognitive linguistics
- – understand how these concepts and ideas are used to explain some longstanding questions in linguistics
- – get a first glimpse of what to expect from this book.

1.1.1 The Development of Cognitive Linguistics

Cognitive linguistics started out in the early 80s with the works of primarily North American-based linguists and philosophers like George Lakoff, Mark Johnson, Ronald Langacker, and Leonard Talmy. Their work shared premises and beliefs that opposed then-dominant assumptions in linguistics and cognitive science. This is clearly illustrated in cognitive linguistics' encounter with generative linguistics. According to Chomsky, the founder of the generative grammar approach to linguistic analysis, human beings are born with the innate capacity to learn language. This capacity was seen as a cognitively isolated phenomenon, a mental module called the Language Acquisition Device (LAD). LAD was considered independent of other cognitive capacities such as perception, imagination, or reasoning. The main feature of the LAD is its ability to give a language specific grammar, which then can generate an infinite number of linguistic utterances from a finite set of rules. Since it focuses on the rules of combination, generative grammar has mainly been concerned with the syntactic regularities of languages. These were assumed to be the driving force behind the seemingly effortless and rapid language acquisition processes observed in children (Chomsky 1965; for a different view on how children acquire language, see Chapter 6). In Chomsky's approach, LAD was the locus of innate linguistic parameters, while the aspect of linguistic meaning has been neglected. Learning a language meant to learn how to set the parameters to the right position during the process of learning. A set of rules typical for a native language would emerge and enable the learner/child to produce grammatically correct sentences. Parameters include for instance 'the word order parameter' (i.e., does the language have the word order subject verb object, or subject object verb for instance) or the 'null subject parameter' (is it possible to leave out the subject pronoun, as e.g. in Spanish; cf. Chomsky/Lasnik 1993). Such a view brought with it a focus on linguistic structure while downplaying linguistic meaning.

Cognitive linguistics opposes some of the pillars of generative grammar. Cognitive linguistics holds that language is not an innate module in the human mind, but is tightly integrated with other cognitive functions and capacities like perception, imagination, and reasoning. In other words, language is embedded in overall cognitive capacities where meaning is not secondary to form. This means that meaning for cognitive linguistics is the focus of attention and the question becomes how we can create meaning "based on our experience of the world and the way we perceive and conceptualize it" (Ungerer/Schmid 1996: x).

Up this point we have seen cognitive linguistics as representing a particular view on language. This outlook aims to explain what meaning is, and through understanding meaning to get at how language actually works. In accounting for meaning, cognitive linguistics is specifically concerned with general cognitive processes (Ungerer/Schmid 1996). By rephrasing language as an integrated part of human cognition, cognitive linguistics provides specific goals and aims for linguistics that differ from other traditions and paradigms (such as structural or generative linguistics). This involves asking questions such as the following:

- How do we construct meaning?
- What is the cognitive basis of language?
- How can we understand abstract concepts like 'love' or 'economics'?
- What role does grammar play in meaning making?
- Can the language we speak influence how we think about the world?
- How is it possible that small children learn a language so fast and seemingly effortlessly?
- How is language related to gestures and bodily communication?

In this book, we discuss these questions. The main proposal connecting the answers is exactly the claim that features of general cognitive processes/cognition are involved in language at all different levels.

1.1.2   Categorization: How Can We Construct Meaning?

Whenever we talk about our experience, we do this via categories. As you will see in Chapter 3, linguistic categories can take many different forms. We can begin with a simple example: the word *cat*. It is a noun that can be analyzed as denoting a category that evokes some kind of common knowledge about cats. Cats often look something like the one in Figure 1.2. They are usually furry and they purr, sometimes they cause allergies in people, some people like cats, some people hate them. When we use or hear the word *cat*, some part of this knowledge about cats can be assumed to be involved. Our knowledge of and experience with cats is processed under a general category of CATS.

Figure 1.2: Cat (Pixabay 2018)

It has been claimed that the ability to categorize experience is not just a basic function for human cognition generally, but indispensable for learning a language (for instance Rosch 1975, Lakoff 1987). Due to its emphasis on meaning and language as having a shared basis with other cognitive capacities, cognitive linguistics considers words as expressing categorizations of the experienced world. This means that understanding language involves not only 'narrow' lexical knowledge of the meaning of words, but crucially involves 'broader' **encyclopedic knowledge**. That is, to know the meaning of a word is not just to know its definition (for instance a *cup* is 'a container for liquid'), but it also involves knowing about the purpose, the dimensions of use, the history, personal experience, and so on (for instance why liquid is put into containers, what type of liquids that are drinkable, and so on).

Experiment

Do the following task: pick ten random objects, it can be any object whatsoever, like a pen, erasers, headphones, coffee cups and similar items that you have around you. Now group these items into at least two piles. After you are done figure out the system behind the sorting and write it down. Run the same experiment with a friend, but do not share your sorting criteria with them. When they are done ask your friends for their sorting principles. Now you can establish the different sorting principles – the principles of categorization governing the formation of the different piles: some were sorted according to color, some were sorted according to material, and some might have been sorted according to size. Figure out how this relates to the categorization in language.

If we conceive of categories in this sense, they need not have neat or discrete boundaries. The boundaries for any given category are rather fuzzy. This means members of one category can be more prototypical and some other members less prototypical and more peripheral. Categories can also overlap so that categorical membership is not exclusive to a single category. One thing can be a member of more than another category. How would you call the group of items in Figure 1.3? We might be inclined to group the items together under a term such as FURNITURE. In this category, we find items such as *chair* and *bed* as quite prototypical examples. In contrast, things like *TV-set* or *electric guitar amp* are less prototypical members of FURNITURE, but quite prototypical for the categories HOME ENTERTAINMENT SYSTEMS and MUSICAL EQUIPMENT respectively. Due to categorization having more or less prototypical members, cognitive linguistics sometimes talk about categories as **radial** (Lakoff 1987; also see Chapter 3.2).

Figure 1.3: Common type of objects categorized as FURNITURE (ClipartPanda 2017)

Tightly linked to categorization is the idea behind **polysemy**. In traditional terms, polysemy describes the phenomenon that a word has several related meanings, for instance *mole*, which can be a burrowing animal, a mark on the skin or a spy. It is differentiated from **homonymy**, which means that two words sound identically but have unrelated meanings, as for instance *bank*, as in 'financial institution' and 'land bordering on a river'.

Figure 1.4: Comic illustrating the different meanings of the word *cookie* (Fernandez 2017)

In cognitive linguistics polysemy is not restricted to nouns, but it is an organizational principle that distributes linguistic items into categories with related senses across all word classes. A very prominent example to explain polysemy in a cognitive linguistics sense is the case of the English word *over* (Brugman 1988). Consider the following examples in (1a-d):

(1) a. *the painting is over the mantel* (meaning 'above the mantel').

    b. *the plane is flying over the hill* (meaning 'across or above the hill').

    c. *Sam lives over the hill* (meaning 'behind the hill').

    d. *Sam turned over* (meaning 'turned around').

<div align="right">(Brugman/Lakoff 2006: 112)</div>

The examples (1a-d) illustrate some of the different senses of *over*, approximation of the meaning given in brackets. Whereas all the different uses of *over* differ in their specifics, the different senses of *over* are derived from the core meaning 'above/across' (Brugman/Lakoff 1988).

In cognitive linguistics polysemy is not limited to lexical categories either. The principle can be expanded to morpho-syntax and all other linguistic levels as well. Consider the examples of the English *–er* morpheme in (2a-c):

(2) a. *teacher* ('human agent')

   b. *villager* ('human living in a particular place')

   c. *toaster* ('a thing that can do what the verb says')

(Evans/Green 2006: 36)

In all three cases the *–er* morpheme adds a slightly different meaning to the words it is attached to. We can thus say that the *–er* morpheme is polysemous. You will find out more about how polysemy and metaphor work and how they contribute to meaning extension in Chapter 3.

How can the knowledge of radial categories and polysemy be used for language teaching? Teaching grammar rules using a radial category approach allows learners to see how rules might blend into one another with better and less good examples. Learners understand the flexibility of rules and how to use them rather than just memorizing them (Littlemore 2009, Tyler 2012). We return to polysemy in 3.1. Additionally, the many meanings and usages of prepositions, a classic topic in the foreign language classroom can be explained more vividly and will help to deepen the understanding of their interplay and complexity.

1.1.3   Metaphors: How Do We Understand Abstract Concepts?

Have you ever thought about why we use expressions like *to be swimming in money*, or how *liquidity* can be used to describe the state of being liquid and the fact that money can be turned into cash quickly? Of course, money isn't actually liquid, and you can't really swim in it.

One answer to this question is found in a central theory in cognitive linguistics: **conceptual metaphor theory**. Let us consider some more examples. Do you know what 'time' is? Can you describe it to someone who doesn't know what it is? Well, even though time might be hard or difficult

to define, we can still talk about it in many different ways. We can *spend time*, *share time*, *waste time,* and do many more (rather concrete) things with time, even though it is an abstract concept. Conceptual metaphor theory states that our thinking is motivated and guided by such metaphorical patterning. In cognitive linguistics, metaphor is more than a figure of speech, it is a way to organize thought and construct meaning in language.

The basic idea is that linguistic meaning is to a large extent based on basic cognitive categorization extended to other domains of experience. This is why cognitive linguists have suggested that linguistic meaning involves mappings from concrete conceptual domains like SPACE to abstract domains like TIME (see for example Lakoff/Johnson 1980, 1999, Johnson 1987, Lakoff 1987). This is exemplified in (3) where the preposition *at* expresses the point in time when an occasion will occur, whereas in (4) the motion verb *soar* is used to express an emotional state.

(3)   *The meeting is <u>at</u> noon*.

(4)   *My spirits are <u>soaring</u>*.

According to Lakoff & Johnson, the preposition *at* and the verb *soar* originally express spatial meanings, but have been extended to other domains like TIME and EMOTIONS. These **mappings** between **domains** are called **conceptual metaphors** (Lakoff/Johnson 1980, Grady 1997). Conceived in such a sense, a metaphor is not just a linguistic figure of speech used for various rhetorical purposes, but rather a cognitive phenomenon reflecting systematic conceptual connections between different domains. In other words, linguistic expressions are seen as surface manifestations of a pervasive underlying cognitive structure. For the same reason, we could expect metaphors to appear just as well in non-linguistic representations like visual media and art (for instance Forceville 2012). We return to conceptual metaphor in 1.2, 1.3 and Chapter 3.

Figure 1.5: Comic illustrating the metaphorical roots of some common expressions (Scott/Borgman 2011, © King Features Syndicate, Inc./Distr. Bulls)

In language teaching, the notion of conceptual metaphor can open the door for many new ways of teaching language and grammar in particular. Knowledge of the ways metaphors work can help students to understand complex grammatical structures in a more tangible fashion. An interesting example of applying metaphor to the instruction of grammar (grammar animations) can be found in Chapter 3 in this volume and Chapters 2.1 and 7.3 in Volume *Language Learning and Cognition* (also see Roche/Suñer 2014).

1.1.4 Grammar in Cognitive Linguistics: The Role of Grammar in Meaning

Grammar seems to be an area many language learners are afraid of. More often than not people envisage grammar as something like tables showing linguistic features like verb or case declensions (Figure 1.6).

Stämme	λογο- Wort, Rede	δημο- Volk	ἀνθρωπο- Mensch	ὁδο- Weg	δωρο- Geschenk
Sing. N.	ὁ λόγος	ὁ δῆμος	ὁ ἄνθρωπος	ἡ ὁδός	τὸ δῶρον
G.	τοῦ λόγου	δήμου	ἀνθρώπου	τῆς ὁδοῦ	τοῦ δώρου
D.	τῷ λόγῳ	δήμῳ	ἀνθρώπῳ	τῇ ὁδῷ	τῷ δώρῳ
A.	τὸν λόγον	δῆμον	ἄνθρωπον	τὴν ὁδόν	τὸ δῶρον
V.	ὦ λόγε	δῆμε	ἄνθρωπε	ὦ ὁδέ	ὦ δῶρον
Plur. N.V.	οἱ λόγοι	δῆμοι	ἄνθρωποι	αἱ ὁδοί	τὰ δῶρα
G.	τῶν λόγων	δήμων	ἀνθρώπων	τῶν ὁδῶν	τῶν δώρων
D.	τοῖς λόγοις	δήμοις	ἀνθρώποις	ταῖς ὁδοῖς	τοῖς δώροις
A.	τοὺς λόγους	δήμους	ἀνθρώπους	τὰς ὁδούς	τὰ δῶρα

Figure 1.6: Case inflection in Greek, for nouns that end with the vowel o (declination for masculine and neuter nouns) (logo, demo, man, road, gift) (Kaegi 1958: 18)

This is often what language students are taught at schools. In Chapter 4, we familiarize you with the nature of grammar in the context of cognitive linguistics. This will help you to understand the view of **construction grammar**. You will understand how constructions work and will see how in cognitive linguistics the divide between lexicon and grammar is solved by the idea of a construction.

For a taste of what is to come, consider the construction in (5):

(5)   *The more, the merrier.*

In classical approaches the meaning of this idiomatic expression would be considered to be stored in the mental lexicon as one unit. However, in construction grammar this view on idioms has been challenged. *The more, the merrier* can be interpreted as having several slots, that can be filled productively to yield other constructions such as *the bigger, the better.* Linguists working with construction grammar say that this is possible because of a schema that allows for the creation of structurally identical expressions. The core meaning is represented in the [THE X-ER THE Y-ER] construction and the x and y slots can be filled in many different ways (Fillmore/Kay/O'Connor 1988). This construction is just one example for how constructions contribute to meaning making. Chapter 4.2 and 4.3 will provide a detailed account on this cognitive linguistics notion. You will also learn how bilinguals' mental representations of constructions work.

1.1.5 Linguistic Diversity, Relativity, and Cognitive Linguistics: Language and Thought

Have a look at the illustration of the Japanese word *tsundoku* in Figure 1.7 below.
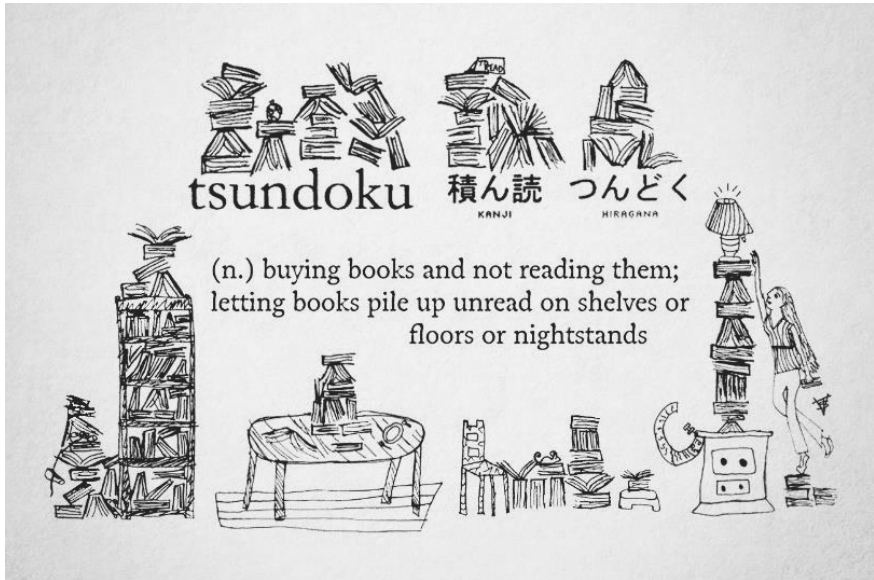
Figure 1.7: An image representing the meaning of the Japanese word *tsundoku* (Sanders 2014: 87)

Given the explanation in Figure 1.7, how would you translate *tsundoku* into your language? If your language is similar to English, the Japanese notion of *tsundoku* cannot be captured by a single word. However, it is easy enough to grasp the idea or the concept behind it.

In Chapter 5, we turn to how languages differ in the expression of meaning, and why this is interesting for cognitive linguists. While it is obvious that languages clearly with respect to words and grammatical regularities, they also differ in terms of what meanings can be expressed, and how these meanings are expressed, as we just saw with the *Tsundoku* example. In 5.1, we examine how fundamental domains of human experience, such as SPACE and BODY PARTS, are expressed differently across the languages of the world. Even though these domains are shared aspects of human experience, we will see that languages nevertheless encode them radically

different. For example, some languages lack words corresponding to terms like *left* and *right*, and instead use words similar to cardinal directions like *east* and *south* for spatial specifications on all scales. Given such substantial variation, we ask in 5.2 to what extent this variation might have an effect on (non-linguistic) cognition. We do so by focusing on the question of **linguistic relativity**: the claim that linguistic differences yield corresponding cognitive differences. After a brief discussion of the philosophical background to linguistic relativity, we turn to assessing a number of recent studies which have been carried out on possible linguistic effects on spatial orientation and gender categorization to just mention a few. In 5.3, we reconnect linguistic diversity and possible relativistic effects with models and theories in cognitive linguistics.

1.1.6   How Do Children Learn Language(s)?

How do children learn the various aspects of language? What enables a baby to seek meaning in interaction with caretakers, and then develop new complex linguistic constructions to eventually arrive at the fully-fledged language as an adult speaker? During language acquisition, linguistic, cognitive, and social development proceed in parallel. In Chapter 6, we examine how these factors interact to guide children's pathway in acquiring language(s). We investigate the impressive perceptual abilities that are already present during the fetal stage and how they guide the learning process (6.1). We follow important developmental milestones that characterize babies' first year of life and address the question of how meaning arises by analyzing children's early use of words. In 6.2, we turn to the multiword stage and ask how children learn to use constructions. Even for languages with seemingly complex patterns of verb positioning, such as German, research findings conclusively show that children master the predominant construction patterns of their mother tongue by age three. We will look at how different theoretical approaches in the field of language acquisition try to account for this impressive feat. Finally, in 6.3, we turn to different contexts in which children acquire more than one language in childhood. We ask what is special about bilingual language acquisition and examine some phenomena that characterize bilingual children's language use, such as language mixing.

1.1.7   Multimodality: Gestures Are Part of Language

In Chapter 7, we discuss language as integrated in a multimodal package. When we talk, we also use other parts of our body, such as hands and the face to communicate. Despite this, gestures have not traditionally been seen as part of language. Recent research has shown, however, that not only is spoken language accompanied by gestures, but gestures also greatly contribute to the expression of meaning. Why is that and in what way are speech and gestures interrelated? We introduce the topic of gesture and gesture research in 7.1 by finding out what gestures are, how they can be categorized systematically into different types, and how they can be analyzed as an integral component of linguistic communication. We then move on in 7.2 to exploring the various ways in which speech and gestures are related to one another. The chapter ends with 7.3 where we discuss the role and importance of gestures from the perspective of learning a second language. Specifically, we explore how gestures can facilitate understanding, memory, and problem-solving. Given the importance of these cognitive abilities for language learning, we touch on the role gestures can play when learning a second language.

1.1.8   Outline

To sum up the itinerary of this volume, after introducing the larger question of what language is and why we need linguistics in language teacher education in Chapter 1, Chapter 2 will recap ways of analyzing language in the traditional way and review some of the linguistic terminology. You will see what this implies for the use of terminology in cognitive linguistics and how traditional linguistic analyses differ from the analyses used in cognitive linguistics. This enables you to classify the innovations of cognitive linguistics. Chapter 3 will explain how you are able to use 'insight' for situations that only on a more abstract level have to do with your sense of vision and how metaphors permeate our thinking. Chapter 4 adds the fun back to grammar since grammar has meaning, too, and will introduce you to the notion and benefit of constructions. Chapter 5 discusses whether the language you speak might influence how you think given that language is based on general cognitive principles. Chapter 6 sheds some light on the question of how we actually learn a language. Finally, Chapter 7 describes how meaning is transmitted not only through spoken language but is a multimodal phenomenon also including gestures.

1.1.9 Summary

- Cognitive linguistics aims to answer the question how natural language works and how it is used and understood.
- Cognitive linguistics is less of a ready-made paradigm but rather a particular outlook and approach to language.
- The most important commonality of different cognitive linguistics approaches is that linguistic phenomena are explained in terms of general cognitive capacities.
- We use our knowledge of the world to form categories.
- Categorization is an important cognitive aspect of language.
- Categories are radial rather than discrete.
- We find categorization at all levels of language.
- One important aspect of linguistic meaning is conceptual metaphors.
- Conceptual metaphors help us to express abstract affairs by using the means used to express concrete affairs.
- Grammar can be analyzed in terms of constructions.
- Grammar is not the opposite of meaning, but is part of linguistic meaning.
- Categories and grammatical constructions found in a given language influence to a certain degree how its speakers talk about the world around them.
- Learning a first language entails linguistic, cognitive, and social development.
- Spoken language is accompanied by meaningful gestures.

1.1.10 Review Questions

1. Why is cognitive linguistics not like other classic theories in linguistics?
2. How is the difference between polysemy and homonymy typically described?

3.   Explain how categorization is one of the general cognitive pro-
cesses that structures language. On which levels of language can
we observe categorization?

4.   Explain in your own words why metaphor is considered more than
just a figure of speech in cognitive linguistics.

1.2   Representing Meaning

Johan Blomberg & Moiken Jessen

In the previous chapter, we acquainted ourselves with some central claims in cognitive linguistics and compared those to other traditions in linguistics. For cognitive linguistics to be a distinctive branch of linguistics, its specific approach to language needs to be applied in analyzing language. The question for this chapter is how language is analyzed from the perspective of cognitive linguistics.

We saw in 1.1 that the overarching assumption across the different approaches to cognitive linguistics is that language is based on general cognitive capacities and the meaningful nature of every aspect of language. This is on the one hand reflected in the words used, semantically, on the other hand it is also reflected in how the words are arranged to form larger meaningful units, in grammar. How can we approach language on all its levels and different manifestations as something meaningful, specifically as grounded in more general cognitive capacities? The answer to this question will become clear as we go deeper into the mindset of some of the more prevalent and influential analytical approaches in cognitive linguistics. For now, we can however say that the cognitive linguistic approach is to detect general structures of linguistic meaning that can be analyzed as based in human cognition, broadly conceived. Importantly, to qualify as such a structure, they must have a systematic character and be recurrent across the languages of the world. Otherwise, they would not be candidates for part of pre-linguistic cognition presumably shared by all human beings.

Study Goals

By the end of this chapter, you will be:
- acquainted with fundamental concepts of cognitive linguistics
- acquainted with how language is analyzed in cognitive linguistics
- able to apply these analytical tools to concrete linguistic examples.

1.2.1 Predication and Visual Perception

An important topic in linguistics is **predication**, because it is a feature that is shared by all languages in the world. The sentences in (1a-c) are examples of predication: something is said about something else. Irrespective of the individual differences between these three sentences, they all have a subject, a predicate, and some kind of object. In very simple terms, this would be a traditional grammatical analysis of the sentence constituents, the word classes that constitute the constituents and the syntactical function fulfilled by them.

(1) a. *The lamp is above the table.*

    b. *The road goes through the forest.*

    c. *The man over there is a real shark.*

Even though such an account is important for the purposes of detecting formal and descriptive features across languages, a cognitive linguist might nevertheless feel that something is missing on this account: the meaning inherent even in grammar. They might ask if there is a reason that predication is so often expressed in the verb or why there are verbs and predications at all. A telling example of meaning in grammar is something as straightforward as word order in English. The two sentences in (2a-b) are comprised of the same words but with the subject and the indirect object (or agent and receiver/beneficiary) swapped. Thus, even though they express the same type relation, their meaning is nevertheless different dependent on the position of the constituents.

(2) a. *Nigel gave Donald an advice.*

    b. *Donald gave Nigel an advice.*

    c. *Der Nigel gab dem Donald einen Rat.*

    d. *Dem Donald gab der Nigel einen Rat.*

In these two examples, *Nigel* is agent in (2a) and receiver or beneficiary in (2b). In English these roles are given to the constituent's order in the sentence, the first one is the agent, the second one the beneficiary. Other languages can have freer word order and assign roles by, for instance, case marking. In the German example (2c and 2d) the meaning stays the same, even though the constituents change, since the case marking assigns the semantic roles.

With these brief examples of how grammatical properties can contribute to expressing meaning, let us in the following go through what a cognitive linguistic account of predication might look like. We begin with the sentence in (1a), which arguably is the simplest of the three in saying something about a static spatial situation. From the perspective of formal grammatical analyses, this sentence might in somewhat simplified terms be considered as comprised of different word classes, such as in (3) below.
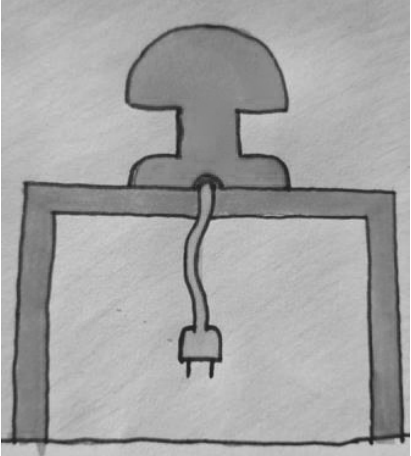
Figure 1.8: Static spatial situation: *The lamp is on the table* (Lara Jessen)

(3)	*the*	*lamp*	*is*	*on*	*the*	*table*
	article	noun	copula verb	preposition	article	noun

Words of different word classes are then combined to form a clause where different combinations perform different syntactical functions, as shown in (4).

(4)	*the + lamp*	*is*	*on + the + table*	
	article + noun	copula verb	preposition + article + noun	word class
	subject	predicate	prepositional predicative phrase	syntactic function

Behind such a formal account, an important meaningful feature can be detected: how the arrangement of different word classes is not only a matter of following grammatical rules, but that these rules unveil an asymmetry between the two nouns used in the sentence: one is more in focus and the other is less salient. We can see this by reversing their relation, as in (5):

(5)   *The table is below the lamp.*

The same spatial relation between a table and a lamp is described in (1a) and (5), but do they thereby mean the exact same thing? Cognitive linguists have argued that this freedom in how to profile or construct a spatial relation unveils how the speaker conceives the situation. Which is of greater relevance in the particular context – the lamp or the table? The difference is not what we are talking about, but how we are talking about it. The way we can use language to profile a situation in different ways is called **construal** in cognitive linguistics (Langacker 1987). Noting such differences in construal, or talking about the same scene in different ways, Langacker states that even though sentences such as those in (1a) and (5) are

> […] truth-conditionally equivalent, describing precisely the same objective situation. Yet they clearly differ conceptually, and since the differences are determined by their form, they must be accepted as aspects of linguistic meaning. (Langacker 2001: 9)

If linguistic form involves how a situation is conceived, then it could be a matter of systematic linguistic investigation. To explore these alternations, cognitive linguists have suggested that their basis can be located in foundational discrimination processes not exclusive to language, but rather in processes that are shared with other domains of human cognition, such as visual perception. To grasp this parallel, let us highlight some organizational features of visual perception. We do not attend to everything we have in the visual field with the same degree of attention. Rather, some things are in the foreground while other things reside in the background. A clear illustration of this can be found in optical illusions. One of the famous examples of such an illusion is the 'Rubin vase', shown in Figure 1.9. This image is a so-called ambiguous form where the image oscillates between a vase (in white) and the contours of two human faces turned against each other (in black). It is always either-or and there is no point in time where

the image is simultaneously perceived as both a vase and as two human faces.
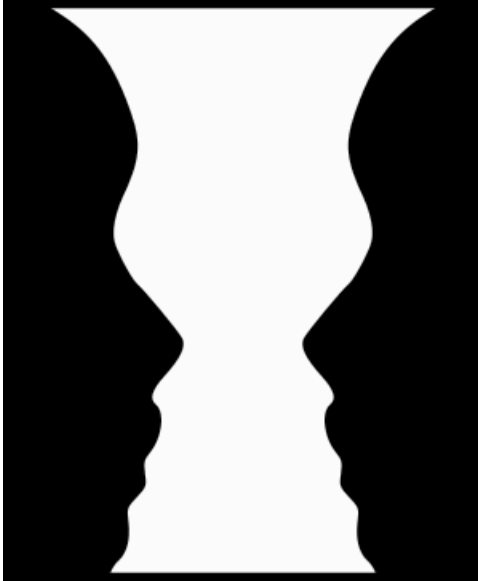
Figure 1.9: Rubin vase. The image oscillates between a vase (in white) and two faces looking at each other (in black) (Wikimedia 2017)

From the example of the Rubin vase (see Figure 1.9), we could say that visual perception puts things in relation to other things, but does so asymmetrically: not all things in the visual fields receive an equal amount of focus. What is focally perceived depends on where attention is directed, which shifts over time. The spatial descriptions in (1a) and (5) can be similarly analyzed: one object is in focus, the other recedes in the background as a reference entity. To capture this, several different terms have been proposed in the literature to refer to the object in the foreground and the object in the background respectively, such as **figure** and **ground** (Talmy 1978, 2000) or **referent** and **relatum** (Miller/Johnson-Laird 1976). For sake of simplicity and consistency, we will use the terms **trajector** and **landmark**. These terms originate with the work of Ronald Langacker (1982, 1987, 1991). Trajector and landmark are not restricted to primarily spatial descriptions (as opposed to figure and ground). We will, therefore, say that the focused entity is the trajector and the reference entity is the landmark.

1.2.2 Image Schemas

As we just saw in 1.2.1, language can serve as a tool for expressing degrees of focus between two entities. Focusing is a mental process that helps us structure input in the visual modality. On the basis of this simple perceptual and spatial model we can extend more complex and less straightforward examples. This is in part due to the asymmetrical relation between the trajector and the landmark: "a trajector as the figure in a relational profile; other salient entities are identified as landmarks" (Langacker 1987: 231). Langacker goes on to add that predicative structures in general manifest this asymmetry:

> With a few if any exceptions, relational predications display an inherent asymmetry in the presentation of their participants. This asymmetry is not reducible to semantic roles, i.e. the nature of participants' involvement in the profiled relationship. [...] it is observable even for predications that designate symmetrical relationships: X equals Y is not precisely equivalent semantically to Y equals X, nor is X resembles Y equivalent to Y resembles X. [...] In the expression X equals Y [...], X is referred to as a trajector, and Y as a landmark. This terminology reflects the intuitive judgment that Y provides a reference point with respect to which X is evaluated or situated. (Langacker 1987: 231)

The asymmetrical relation between a trajector and a landmark does not exist in a vacuum. Seen from the point of view of the asymmetry between trajector and landmark, we could extend to say that a predication is situated against a more general region of possible meanings that could be communicated. A speaker can choose to construe a situation in different ways, with each different construal signaling the perspective taken by the speaker. Langacker proposes that this perspectival nature is shown in language through the variety of ways that one can linguistically construe or profile one and the same situation. There are several different construal operations identified by Langacker. For now, let us note two different types of construal operations. One type of construal operation identified by Langacker is how language allows for the same the same state-of-affairs to be specified with varying attention to details. This can be exemplified with the

sentences (6)-(8) where the same situation is referred to with different degrees of specificity.

(6) *Someone does something*.

(7) *A person bites an animal*.

(8) *The small blonde man with a mustache bites the big furry dog in the tail*.

These variations could be seen as the result of the information perceptually available to the speaker, or they could be considered to signal different kinds of communicative intents on the speaker's behalf, such as a higher degree of attention to distinguishing traits of the agent and patient in (8) than in (6) and (7). Attention to detail is, therefore, another dimension of linguistic construal.

Apart from the attention to details expressed linguistically, other kinds of alternations can be linguistically marked. The same situation in the real world can be linguistically construed or profiled differently dependent on the speaker's vantage point. For instance, verbs like *come* vs. *go*, and adverbs like *here* vs. *there* mark the viewpoint (typically that of the speaker) of the construed situation (see Chapter 5). One and the same situation can be construed differently depending on the where the speakers are spatially located. We can imagine two persons at different locations trying to figure out where something is, as exemplified in (9a-b).

(9) a. *The ball is here.*

  b. *No, it's not here, it's there.*

Construal is not limited to such explicitly speaker-relative (or deictic) references, but is part of every linguistic meaning. Meaning is omnipresent since speakers and addressees always construct meaning out of their perception.

We have tried to show that linguistic expressions, though seemingly similar or identical, can have different construals and hence different meanings. The basis for this difference in meaning can be sought in various cognitive processes not specific to language. Since these differences are both grammatically (such as assigning subject or object roles) and semantically marked (for instance using specific verbs over more general verbs), they should be part of how linguistics is conducted. However, how do we go about detecting, analyzing, and representing such phenomena?

We saw in 1.2.1 that meaning in cognitive linguistics is seen as an analog, **gestalt**-like phenomenon, which is why it is common to represent linguistic meaning in a similar way. To illustrate this, we can return to the table and the lamp in examples (1a) and (5). The difference between these two re- sides in whether the lamp or the table is in focus. Is it possible to explicate and represent the difference between these two situations according to a cognitive linguistic perspective? Cognitive linguists have proposed that schematic images can be used to represent the type of meaning involved in these situations. The difference between *above* in (1a) and *below* in (5) is illustrated in Figure 1.10.
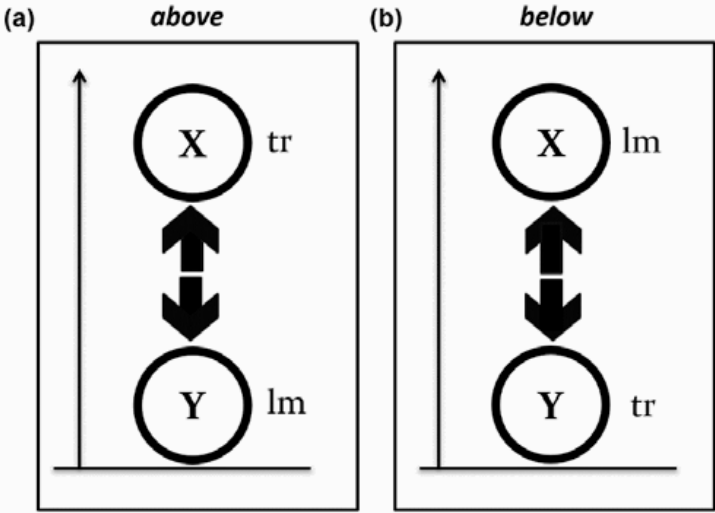
Figure 1.10: Image schemas of *above* and *below* (Langacker 2008a: 71)

You probably already know which of the two images in Figure 1.10 repre- sents *above* and which represents *below*. The difference is the assignment of the focus to either x (table) or y (lamp). If x is in focus, it is the trajector that is construed in relation to y, the landmark. The image to the left shows this situation and represents a relation in terms of *above*. The allocation of focus is reversed in the image to the right: y is the entity in focus, the tra- jector, now construed against the landmark x, representing *below*.

As a tool for analyzing linguistic meaning, such figures have been called **image schemas** (see Johnson 1987; Langacker 2008a for more details). The images are meant to capture the gestalt-like character of meaning in

general, while at the same time being sufficiently abstract to cover a wide range of meanings. We can see an example of this generality as we analyze the meaning of a **construction**, (see Chapter 4) like verb + *out*. This can be seen as following three different out-schemas (see Figure 1.11 below). Whereas (10a) expresses a single vector for the trajector, *out* in (10b) expresses a slightly different meaning of the trajector spreading out in an arch. In (10c), *out* attains a somewhat different meaning of a straight trajectory without moving from a state of physical containment. Since the same word – *out* in this case – can refer to different spatial situations, it is common to analyze it as **polysemous**. We return to this in more detail in 1.2.3.

(10)   a.   *Mary went out of the room.*

       b.   *Roll out the red carpet.*

       c.   *The train started out for Chicago.*
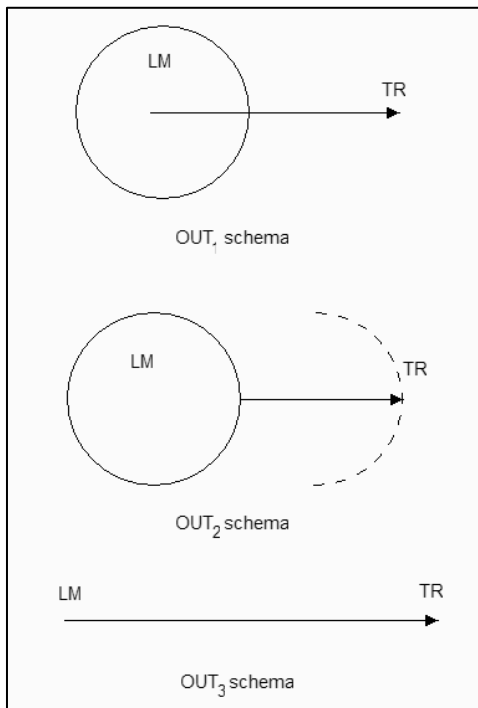
Figure 1.11: Image schemas for three different *out*-schemas (Johnson 1987: 32)

An important feature of image schemas is their dynamic character. They are not completely static forms, but are open to various manipulations and entailments (Johnson 1987). For instance, we can follow the trajectors in Figure 1.11 as moving from the inside to the outside. Image schemas are not only meant to represent linguistic meaning, but in line with the tenets of cognitive linguistics they are also considered as emergent on the basis bodily and perceptual interactions with the world. Conceived in such a sense, image schemas are important for having "meaningful, connected experiences that we can comprehend and reason about" (Johnson 1987: 29).

To summarize, we have seen that image schemas capture a few general features considered essential to meaning in cognitive linguistics, such as its analog (as opposed to digital or binary) and gestalt-like form. Image schemas are regarded as structures emerging from embodied pre-linguistic experience, and thus anchoring linguistic meaning in general cognitive structures. This is summarized by Mark Johnson in the following way:

> [image schemas] are a recurring dynamic pattern of our perceptual interactions and motor programs that gives rise to coherence and structure to or experience. (Johnson 1987: xiv)

1.2.3 The Systematicity of Non-Literal Language

We have seen that image schemas can be used to represent how a trajector and a landmark are related to each other. We will now look at an extension of this idea. An important feature of image schemas is that they can be extended to an analysis of non-spatial and non-literal senses. In other words, image schemas are not just for analyzing expressions as those in (10a-c), but can be used more broadly. This has been used to show that the same cognitive and perceptual structures that provide meaning to literal language are also the source of meaning for non-literal language. In this section, we take a look at what a non-literal use of language looks like and how this has played a significant role in the related models of conceptual metaphors.

We mentioned in 1.1.2 that conceptual metaphors are based on abstraction from the concrete domain. We have seen that concrete spatial expressions can be analyzed in terms of image schemas. While this is fairly straightforward as long as we remain within the realm of literal and spatial meaning,

it gets more challenging with non-literal senses. Consider the construction used in (10a-c) above: verb + *out*. Instead of pertaining exclusively to a physical situation, the same construction can be used as in (11) to express a change in mental state.

(11)   *I went out of my mind*.

Within **conceptual metaphor theory**, this sentence is analyzed as mapping a construction with a spatial meaning (*go + out of*) onto another domain, in this case a mental state. In cognitive linguistics, this is the specific reading of metaphor: a **cross-domain mapping** typically from one experientially concrete domain onto a more abstract one. Language is filled with such metaphors, such as *lose one's head* or *fall into oblivion*. These idiomatic expressions are not interpreted literally – no one is actually losing her head or falling. Instead, they rely on a metaphorical interpretation. Similarly, in sentence (1c) above it is obvious that a human being is not literally a shark. One of the important tenets of cognitive linguistics is not only to detect metaphorical expressions, but also to explore their systematic character. For instance, we can analyze (11) as a case where the mind is metaphorically described as a container landmark. If someone *goes out of this*, it means to not be the person they normally are. Due to their systematic character, metaphors have been proposed as a general cognitive mechanism rather than something restricted to language (Lakoff 1987). There are for instance many ways to express time through spatial expressions, as in (12a-c), but the reverse pattern is more restricted.

(12)   a.   *Christmas is ahead of us.*

       b.   *Time stands still.*

       c.   *It took a long time to finish the book.*

If words and constructions can attain both concrete and abstract meanings, they can be analyzed as having several different but related senses. This takes us to another important aspect of semantic analysis in cognitive linguistics: **polysemy**. Many cognitive linguists have attempted to characterize polysemy through so-called polysemy networks (Figure 1.12). These detail how related meanings of a particular word belong together, emanating out from a central or prototypical meaning. Figure 1.12 shows a polysemy network for the preposition *over,* which, as we discussed in Chapter 1.1.2, has several different but related senses, as shown in (13a-d).
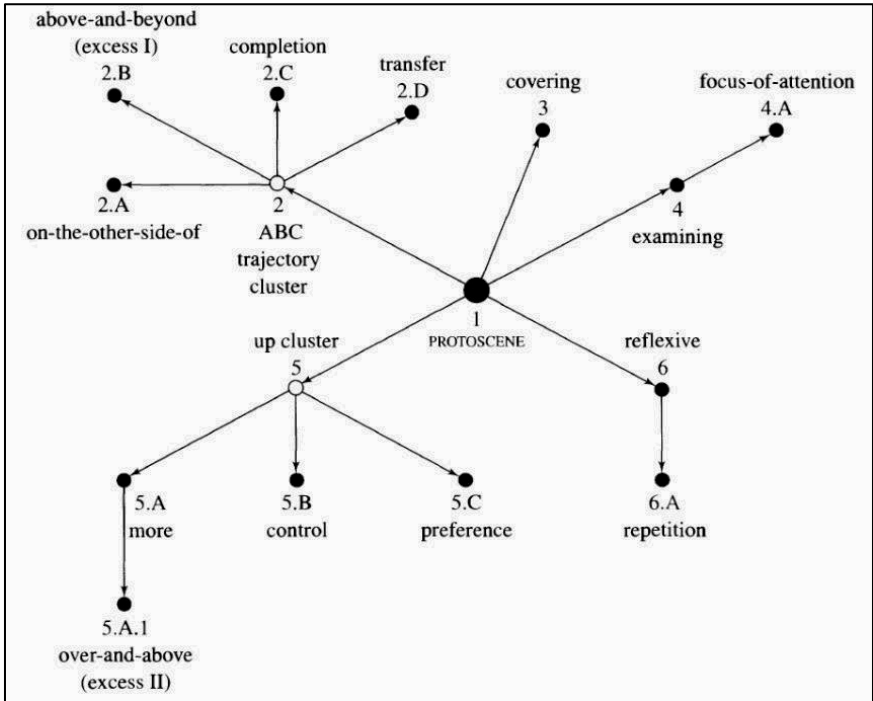
Figure 1.12: A polysemy network of *over* (Tyler & Evans 2001: 746)

(13) a. *The helicopter hovers over the bridge.*

　　　b. *The dog runs over the bridge.*

　　　c. *They live over the mountains.*

　　　d. *The picture hangs over the wall.*

Even if these four sentences all describe spatial relations, they refer to quite different situations. In (13a), *over* locates the trajector above the landmark, but in (13b) the trajector is moving across the landmark. In contrast, (13c) differs from both by implicitly referring to the relation between the speaker and the landmark (*mountains*). Finally, (13d) does not involve a vertical relation between trajector and landmark (as in 13a-c). In this sentence, *over* could be analyzed as expressing the sense of '*covering*' (that is, sense 3 in Figure 1.12).

In sum, many different conventional expressions are polysemous and have a metaphorical component. One consequence that has been drawn from the

tangible metaphorical organization of language is its roots in perception, imagination, and bodily integration. In effect, linguistic meaning is integral to language. Specifically, cognitive linguists have emphasized how meaning need to take these features into account rather than analyze meaning as mainly a matter of logical and formal relations. In other words, an analysis of language is primarily directed towards how people understand, conceive, and make sense of the world.

1.2.4   Summary

- All levels of language bear meaning, the morphological, the lexical as well as the grammatical level.
- The way meaning is represented by all linguistic levels is subject to analysis in cognitive linguistics.
- Meanings are analogue, gestalt-like phenomena that derive from general cognitive principles, like backgrounding and foregrounding information in visual perception.
- Linguistic predication follows the organizing principles of visual perception in that extra-linguistic information can be linguistically foregrounded or backgrounded.
- This is the principle of linguistic construal (compare *The lamp is on the table* vs. *The table is under the lamp*).
- Because of the similarities between general cognitive processes and linguistic processes language should be described in a way that shows it as similar to these cognitive principles.
- Image schemas, mappings, networks, and the idea of trajector and landmark present ways of doing so.
- The terms 'trajector' and 'landmark' designate the roles played by real world participants and things play in verbalization.
- Image schemas contain trajectors and landmarks.
- Image schemas can be mapped onto domains (for instance how spatial image schemas can be mapped onto the domain of EMOTION).
- This mapping opens the possibility to linguistically express abstract things in concrete terms, so-called conceptual metaphors.

- Since words and phrases can obtain concrete and abstract meanings, we observe polysemy in language.

1.2.5   Review Questions

1.   Give an example of meaning at the morphological and grammatical level.
2.   What is construal?
3.   What are the analog representations of linguistic meaning called in cognitive linguistics?
4.   What is a cross-domain mapping from a concrete to an abstract domain called in cognitive linguistics?

1.3   Theoretical Cornerstones in Cognitive Linguistics

Johan Blomberg & Moiken Jessen

When we introduced cognitive linguistics in 1.1, we began by noting that different research strands in cognitive linguistics are brought together by the aim to find a firm basis for language in the cognitive abilities of human beings to create meaning. We noted that language in cognitive linguistics by and large is considered a cognitive phenomenon – including perceptual and bodily skills. At the same time, cognitive linguistics, therefore, rejects the assumption that language is isolated from the ways in which we can experience the world. General cognitive principles are thus expected to shape language, and it is in this regard that the cognitive linguists sometimes claim that study of language is generally a branch of human psychology (cf. Langacker 1986: 3).

Now that we from 1.2 know more about how cognitive linguists analyze and represent meaning in terms of visual perception, image schemas, and metaphors, it is time to bring these analyses back to the fundamental question: what is meaning and what is language? We do so by pointing out some answers given from a cognitive linguistics point of view. Specifically, by expounding on the analyses discussed in 1.2, we take a look at why cognitive linguists analyze language the way they do, and why language is considered as part of general cognitive abilities. In technical terms, this chapter explores the **ontology** of cognitive linguistics. In charting the ontology, we look at the fundamental properties of language from a cognitive linguistics perspective. This involves primarily investigating three central claims on the nature of language as crucially dependent on mental and cognitive abilities (cf. Langacker 1986, Tyler/Evans 2001, Croft/Cruse 2004). These claims are that:

- Language must be understood through the function it serves.
- Language is based in mental conceptualization.
- Language is intrinsically embodied.

This chapter acquaints us with these claims in order to present some of the most important theoretical pillars in cognitive linguistics. On the one hand, this allows you to have a clearer grasp of the connection between theory and method in cognitive linguistics. On the other hand, it intro-

duces and explains some of the theoretical notions and concepts used in cognitive linguistics.

Study Goals

By the end of this chapter, you will:

- know some of the basic theoretical concepts in cognitive linguistics
- understand the required conceptual and theoretical vocabulary
- have a further understanding of the connection between linguistic analyses and theoretical considerations in cognitive linguistics.

1.3.1 Language Must Be Understood through the Function It Serves

There are different approaches to language in linguistics. We can generally make a distinction between two different ways to approach language: a **formal** and a **functionalist perspective** on language. An example of a formal approach is to consider language as best analyzed and described in terms of explicating the rules for forming syntactically valid sentences. A formal analysis only looks at the syntactic rules of a language largely independent of its meaning and use. One of the most influential proponents of such an account is the previously mentioned Noam Chomsky, who argues that some version of a formal approach is the only scientifically valid one in linguistics (Chomsky 1965, 1981, 1995, inter alia).

> [T]he study of meaning and reference and of the use of language should be excluded from the field of linguistics. […] [G]iven a linguistic theory, the concepts of grammar are constructed (so it seems) on the basis of primitive notions that are not semantic (where the grammar contains the phonology and syntax), but that the linguistic theory itself must be chosen so as to provide the best possible explanation of semantic phenomena, as well as others. (Chomsky 1977: 139)

We can contrast a formalist approach with a functionalist one. On a functionalist reading, the study of language necessarily involves a consideration of the social and cognitive functions language serves. Since language is used for communicating with other persons (and with oneself), a functionalist approach argues that the study of language must necessarily take this function into account. Broadly speaking, cognitive linguistics proposes a functionalist theory of language: the function of language is for someone to mean something about something. At first glance, this might seem like an obvious claim. In the following, we will attempt to flesh out this claim. We start from the difficult notion of meaning. Expanding from an earlier quotation, meaning and its relation to linguistics can be described in the following way:

> [M]eaning is equated with conceptualization. Linguistic semantics must therefore attempt the structural analysis and explicit description of abstract entities like thoughts and concepts. [...] [C]onceptualization resides in cognitive processing, our ultimate objective must be to characterize the types of cognitive events whose occurrence constitutes a given mental experience. (Langacker 1986: 3)

There are two significant theoretical features of cognitive linguistics in this quotation. First, the claim that 'meaning is conceptualization' states the prominence of thinking and conceptual activity for language. Second, bringing together the function of language with the workings of the human mind. In this book, we introduce different linguistic phenomena that have been analyzed from cognitive linguistics perspectives. In the following two sections, we get a brief glimpse at two such integral abilities. We begin with the role our knowledge of the world has for language.

1.3.2 Language Is Based in Mental Conceptualization

Cognitive linguistics proposes that an adequate linguistic theory must make the function of language center stage, which, as we have just seen, is for someone to mean something about something. Moreover, the function of language crucially involves the general cognitive and conceptual abilities of human beings.

Figure 1.13: Is the mountain range static or moving? (Bernhard Krichbaumer)

Let us illustrate this with a linguistic example. Something that we will frequently return to is the pervasive use of non-literal expressions. One example is that static spatial situations can be described with verbs of motion – the exact opposite of stasis. This is shown in examples (1) and (2) where the configuration of immovable entities is described with the help of motion verbs.

(1) *The mountain range **goes** all the way from Mexico to Canada*. (Talmy 2000: 104)

(2) *Det sammetmörka diket **krälar** vid min sida*. (Tranströmer, *April och tystnad*, 2–3) (The dark velvet ditch **creeps** by my side.)

What is the basis for using words with dynamic meaning for describing stasis? Cognitive linguists have argued that such **fictive** uses of motion verbs cannot be explained by appeal to the truth of the claim in question – obviously, roads and ditches cannot move. Instead, sentences like (1) and (2) require an account of how speakers conceive and perceive their spatial environment (Talmy 2000). It is not just a description of what the language user is seeing in a spatial situation, but also how they are conceptualizing the situation. This tendency to use motion verbs for describing static

situations have been attested for other languages than English (cf. Blomberg 2015). We can explore the role of human cognition in linguistic meaning in more detail. To do so, let us return to the notion of construal introduced in Chapter 1.2.1. Recall that 'construal' is a technical term pointing exactly to how a situation is linguistically profiled. Let us now use two fictive motion sentences where the order of the two reference points is reversed in (3) and (4).

Figure 1.14: Does the scar extend from the elbow or from the wrist? (Lara Jessen)

(3) *An ugly scar extends from his elbow to his wrist*.

(4) *An ugly scar (extends/goes/runs/reaches/stretches) from his wrist to his elbow.*

<div align="right">(Langacker 2001: 9)</div>

Do they express the same or different meanings? On the one hand, they describe the same situation – a scar on a forearm. On the other hand, they differ exactly in how the situation is profiled by the language user. A cognitive linguistic analysis proposes that the difference in construal between (3) and (4) reflects a difference in the cognitive processing 'building up' to the full conception. Sentence (3) signals that the process had its starting point at the elbow and ended by the wrist. This relation is reversed in (4). We can describe what is underlying the difference in construal between (3) and (4) as reflecting a dynamic process of **mental scanning**. In using (3) over (4), there is a type of non-actual movement involving 'moving' one's attention across an actual or imagined situation. In other words, the sentences in (3) and (4) can be analyzed as reflecting the dynamic cognitive process of gradually shifting attention.

Langacker's explanation in terms of mental scanning is but one example of how cognitive linguistics aims to find the basis for linguistic meaning in mental conceptualization and general cognitive abilities not unique to language. As we progress through this book, we will continually return to such accounts in detail.

1.3.3 Language Depends on the Embodied Mind

Cognitive linguistics claims that our concepts and world knowledge is what essentially nourishes language. The basis for this resides in the cognitive abilities of human beings. In cognitive linguistics, a specifically important aspect is the role of sensorimotor capacities originating from the human body. To understand cognitive linguistics' position on this matter, we have to make a brief detour into history of ideas to touch on the **mindbody problem**.

What is the (human) body? In classical philosophy – clearly articulated by 17th century philosopher René Descartes – the body is a vessel for the human mind. The body receives input from the external world that is comprehended by the intelligibility of the mind, which in turn can make the body act according to its will. For Descartes, this is the difference between human beings and animals: the latter are mere automata lacking a mind. However, by insisting on a sharp distinction between the physical body and the immaterial mind, this poses a huge problem: how can something immaterial be related to something material?
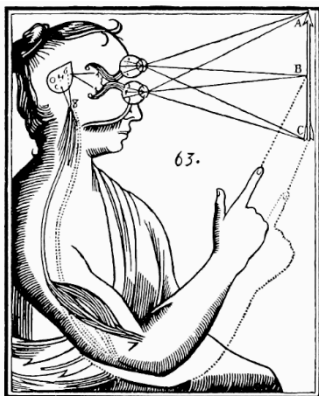
Figure 1.15: René Descartes' illustration of the mind and the body (Descartes 1664)

Of course, Descartes' 17th century view is by and large inspired by Christianity. Yet, the echoes of his views on the body and the mind can still be heard in contemporary debates in the mind sciences. An alternative view is to consider the human mind as intrinsically bodily. Such a view on the body and the mind as an integral part of cognition is found in the idea of

embodied cognition, which has been an important cornerstone for cognitive linguistics. Varela, Thompson & Rosch (1991) summarize the notion of embodied as follows:

> By using the term 'embodied' we mean to highlight two points: first that cognition depends upon the kinds of experience that come from having a body with various sensorimotor capacities, and second, that these individual sensorimotor capacities are themselves embedded in a more encompassing biological, psychological and cultural context. (172–173)

As can be seen in this quotation, the body is not just a physical thing regulated and maintained by biological processes, but also a perspective of the experienced body. Just consider a simple example as reaching out for a bottle of water standing on the table next to you. While we are not typically aware of it, this action requires a complex coordination between various sensory and motor capacities of the body. The distance to the bottle must be gauged with the eyes, and this information must be communicated to the hand in order for it to grasp the bottle. Thus, even though we do not attend to our own bodies, it is a constant companion in all activities, and what we can do is in a sense dependent and constrained by the capacities of our body. To just give a few examples, we can mention the following roles of the body in human cognition (adapted from Wilson/Foglia 2017).

- When speaking, we use gestures not only to accompany speech but to actually facilitate language processing (McNeill 1992; see also Chapter 7).
- Vision is guided by our actions, goals, and intents with bodily feedback integrated into visual processing (O'Regan/Noë 2001).
- So-called **mirror neurons** activate not only when we perform an action, but when we see others perform the same action (Rizzolatti/Craighero 2004).
- Cognitive tasks such as remembering are more efficient when we use our bodies and even including the surrounding environment in cognitive processing (Donald 1991).
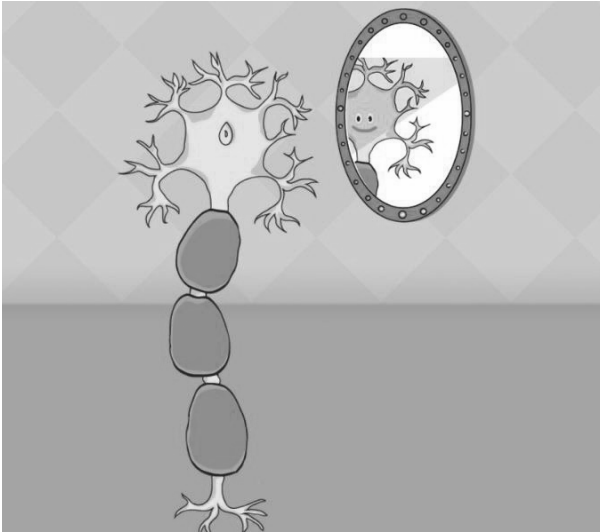
Figure 1.16: A comic illustrating the metaphorical aspect of the term 'mirror neu-ron' (Ufer 2018)

1.3.4 How Is Embodied Cognition Related to Language?

How is embodied cognition related to language? If our bodies constrain and enable us to know what we know about the world, then we might ex-pect language to also be affected in a similar way. As social beings we would like to share what we know and what we experience with others. Our tool for sharing these things is language. Evans & Green summarize this idea as follows:

> [O]ur experience is embodied, that is, structured by the nature of the bodies we have and by our neurological organization […] the concepts we have access to and the nature of the 'reality' we think and talk about are a function of our embodiment: we can only talk about what we can perceive and conceive, and the things we can perceive and conceive derive from embodied experience. (Evans/Green 2006: 46)

On such a view, we have access to the world mainly by virtue of having a body. It factors as both an enabling and a constraining condition for

experience. In turn, this will also affect what can be linguistically expressed, and just as importantly, how it is expressed. It has been argued that a majority of more or less conventionalized expressions in language is formed on the basis of systematic connotations and associations through embodied sensorimotor interaction. One such prominent analysis of linguistic expressions, originating from the collaborative and individual works of George Lakoff and Mark Johnson, proposes that linguistic meaning is to a large extent based on foundational categories or domains of bodily space. These meanings are then used as templates or schemas for structuring and ordering more complex and abstract meanings in both language and thought. Have a look at examples (5) and (6) below.

(5) *The meeting is <u>at</u> noon.*

(6) *My spirits are <u>soaring</u>.*

In these examples we treat abstract terms as if they were physical entities that could be located in or move through space. This is why Lakoff & Johnson suggest language involves mappings from concrete conceptual domains like SPACE to abstract domains like TIME (see for example Lakoff/Johnson 1980, Johnson 1987, Lakoff 1987, Lakoff/Johnson 1999). This is exemplified in (5) where the preposition *at* expresses the point in time when an occasion will occur, whereas in (6) the motion verb *soar* is used to express an emotional state.

As we mentioned in 1.1.3, Lakoff & Johnson propose that *at* and *soar* originally express spatial meanings, but they have through processes of abstraction been extended to other domains, like TIME in (5) and EMOTIONS in (6). Due to our bodily interaction with the world, basic meanings are formed, which stand in as templates or schemas for structuring less tangible meanings. These mappings between domains are called **conceptual metaphors** (Lakoff/Johnson 1980, Grady 1997). Conceived in such a sense, a metaphor is not a figure of speech for rhetorical purposes, but rather a cognitive phenomenon reflecting systematic conceptual mappings between distinct domains. In other words, linguistic sentences can be seen as surface manifestation of a pervasive underlying structure of human cognition as establishing links between conceptually distinct domains. This is one way in which the study of language has been considered to contribute to understanding the human mind.

1.3.5 Empirical Studies on the Idea of Embodiment

Now we know about the mind-body problem and how embodiment is related to language. But how exactly does this relation work, how do we leap from here to meaning making in language? On this question, scientists have not fully agreed. Nevertheless, we would like to present one idea to you: Bergen (2012) argues that one way people make sense of the world, is what he calls **embodied simulation**. Embodied simulation refers to the possibility that we understand meaning transported to us via language by simulating in our minds the experience that the language describes. We can simulate because we have memories of our own experience of a similar event. As a result, we simulate constantly. But unlike the conscious recollection of faces of friends or relatives, sounds, music, tastes, smells, and actions, embodied simulation happens, and we are not aware of it. Embodied simulation happens when our mind creates mental experiences of sense perceptions and actions without them being present. The same processes that we consciously activate to do any kind of action are actually also busy when we are in the process of understanding language. Research shows those areas of the brain that deal with actions and perceptions are also active when we understand utterances such as *turn the key* or *kick the ball*. In its broadest interpretation, this means that when we use or understand action verbs, our low-level motor and perceptual brain structures are active for imagined action, because the brain activity in these areas can be made visible. This supports the notion that in language processing, meaning, and thought are tightly grounded in the experiences individuals have from their interaction with the world around them.

Starting from this idea that the brain makes use of the fact that it can form imagery of events that happened before in order to understand linguistic input let us see what ways there are to actually show this on an empirical basis.

One of the more influential paradigms has found a close connection between word meaning and brain activity. The three action verbs *kick*, *pick*, and *lick* refer to actions carried out with different parts of the body: the legs, the hands, and the tongue, respectively. Grounded cognition suggests that language processing is not restricted to the traditional language regions of the human brain, but also involves those responsible for bodily and perceptual processes. We could, therefore, expect these three verbs when heard or spoken to involve activation of corresponding parts of the motor

cortex (legs for *kick*, hands for *pick*, and mouth for *lick*). By investigating the activity in motor cortex, this hypothesis was confirmed: words activate the same parts of the brain as when their corresponding action is performed (Pulvermüller 2005).
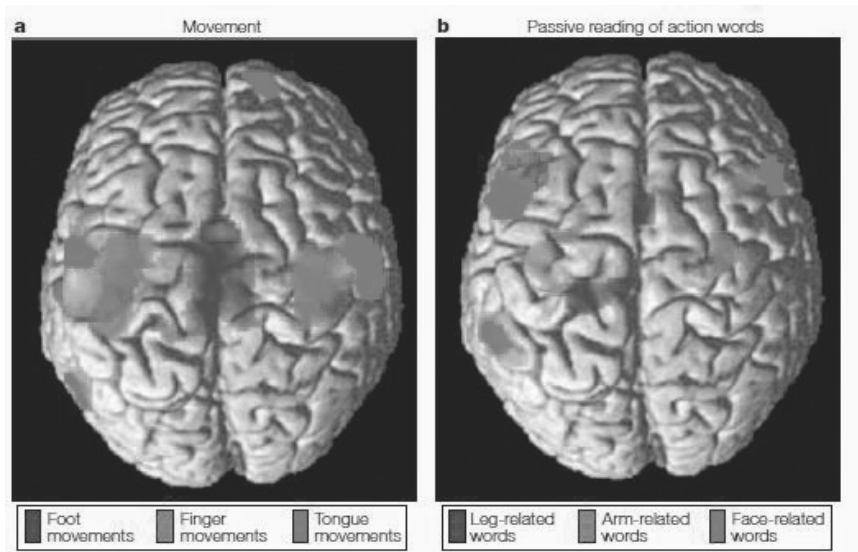
Figure 1.17: Activation in brain areas controlling movement of the feet, fingers, and tongue in response to leg-, arm-, and face-related words (Pulvermüller 2005: 576)

In another experiment, cognitive psychologists (Stanfield/Zwaan 2001) found empirical evidence for the fact that knowledge of language is based/grounded in experience. Participants were presented sentences like the following:

(7) *The carpenter hammered the nail into the floor.*

(8) *The carpenter hammered the nail into the wall.*

Right after the presentation of each sentence, participants were shown pictures of objects, like elephants or nails and they had to decide as quickly as possible whether the object in the pictures occurred in the sentence they just heard or not. The critical items – the pictures with a nail on them – covered two conditions. In the images, the nail was in a horizontal position, as in *hammered it into the wall*, and the nail was in a vertical position, as in *hammered it into the floor*. When the position of the nail in the image

was the same as the implicit position of the nail in the sentence, participants answered faster, than when it was a mismatch between positions. The explanation, you guessed it, is that when the mental image that was caused by the stimuli sentences was closer to one of the two conditions on the pictures, it made it easier for people to recognize the object.
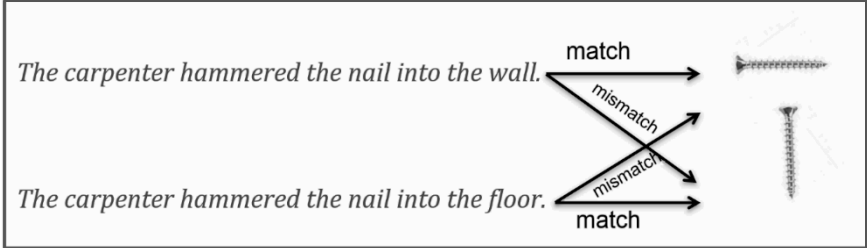
Figure 1.18: Stimuli similar to those used in the orientation experiment by Stanfield & Zwaan 2001 (Bergen 2012: 55)

Embodied cognition research in this and other areas has contributed substantially over the past decades 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 research including a classification grid 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, bodily engagement has also received a great deal of attention (e. g. Driver 2012, Wik/Hjalmarsson 2009). In most cases, however, instructional methods were not consistently grounded in a theoretical framework that properly describes the links between language and embodied cognition. So far, the application of insights into language teaching has led to a growing body of research focusing on whether the integration of embodied experiences can facilitate access to relevant concepts of grammar that often remain hidden to learners, and can compensate for an overemphasis on the formal aspects of grammar (Suñer/Roche 2021, Bielak/Pawlak 2011, Jacobsen 2018, Kohl-Dietrich/Juchem-Grundmann/Schnotz 2016, Reif 2011, Tyler/Mueller/Ho 2011, Yasuda 2010).

1.3.6 Summary

- Different approaches in linguistics theory focus on different linguistic aspects.
- Formalism and functionalism are two different approaches in linguistics.
- Formalism studies rules for forming valid expressions, functionalism studies the purpose language serves.
- Cognitive linguistics is a version of functionalism understanding language through its basis in human cognitive abilities.
- Cognitive abilities include perception, motor systems, reasoning, and imagination.
- Embodied cognition is the claim that human cognition is intrinsically dependent on the bodily capacities of cognitive agents.
- The understanding of human cognition in cognitive linguistics is largely influenced by embodied cognition.
- We have access to the world mainly by virtue of having a body.
- This has an effect on what can be linguistically expressed and how it can be expressed.
- Basic semantic categories of spatial meaning emerge from bodily interaction with a surrounding world.
- Linguistic sentences can be seen as surface manifestation of a pervasive underlying structure of human cognition establishing links between conceptually distinct domains.
- Mental scanning happens when we are in the process of understanding language.
- There are some empirical studies that try to show mental scanning.

1.3.7 Review Questions

1. What is the difference between a formalist and functionalist approach to linguistics?
2. Name one general cognitive and conceptual ability of human beings that is reflected in language. Illustrate with an example.

3.   Recap: what is the mind-body problem?
4.   How does embodiment aim to overcome the mind-body problem?
5.   What is mental scanning?

2 Morphology

The term 'morphology' refers to the linguistic study of all manifestations and structural shapes of words, especially the inflections of their base form. The original meaning of the term, 'the study of forms', has changed in modern linguistics to 'the study of the words'. Or, to be even more precise, 'the study of the formal manifestations of words in a language'. August Schleicher was the first to use the term 'morphology' for a comparative study of linguistic forms. He meant to create a parallel to the morphology of natural sciences. Within the boundaries of language study, the term was used for various areas of grammar over time: in part for inflection, in part for word formation, sometimes for both syntax and lexicology. In the present chapter, morphology is concerned with lexicology, 'the study of the composition and structure of words'. It includes the description of the processes through which new words are created, that is, word formation. In doing so, we discuss morphological phenomena less in terms of classifying aspects but rather in terms of a cognitive linguistic perspective. The reason behind this is to emphasize and describe cognitive representation patterns of meanings. They also serve as examples of the dominant perspective on the relation between conceptualization processes and linguistic structures (cf. Janda 2007: 632–633). The next two chapters will focus on various morphological aspects of the German language: Chapter 2.1 deals with the aspect of meaning in morphology, Chapter 2.2 focusses on creative word formation processes.

2.1   Semantics and Word Formation

Marina Foschi Albert & Marianne Hepp

In the following chapters you will become familiar with classic areas of morphology. We will introduce the unique perspective of cognitive linguistics on identical phenomena in the respective chapters via appropriate 'windows' into the topics. This is to say that we will contrast the classic perspective on linguistic phenomena with the more recent interpretative perspective of cognitive linguistics, where appropriate. In so doing, you will receive a fresh insight into a new linguistic theory. This chapter deals with the meaning of words both in their simple and their compound form. When discussing simple and compound words, it is important to distinguish between lexical and contextual meaning. After presenting a definition of the term 'word', we will examine the process of word formation and show how words can be separated into their constituent elements.

Study Goals

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

–   explain the connection between semantics and morphology
–   define a word
–   recognize how the meaning of a word is constituted and performed
–   understand how new words can be formed.

2.1.1   What Does Semantics Mean and What Is Its Connection to Lexicology?

How can we know what, for example, the German word *Papier* (paper) means? Semantics is the theory of meaning and meaning research. It is a linguistic branch closely related to other disciplines: logic and psychology among them. But what is the relation between word and meaning? It is often assumed that the relationship between meaning and word is direct and equal. However, a quick glance into a dictionary refutes this notion.

This is exemplified by the fact that the *Digitales Wörterbuch der deutschen Sprache* lists not merely one, but four main meanings for the word *Papier*:

(1) *besonders durch Verfilzung und Verleimung von Pflanzenfasern gewonnenes dünnes, flächiges Material, das vorwiegend zum Beschreiben, Bedrucken und Verpacken dient.* (thin, planar material obtained in particular by felting and gluing plant fibres; primarily used for writing, printing and packaging)

(2) *Schriftstück, Dokument, Aufzeichnung* (document, record)

(3) *amtlich beglaubigtes Dokument, das der Legitimation dient* (*nur im Plural*) (officially authenticated document, used for legitimacy, ID (only used in plural))

(4) (*Börse*) *Wertpapier, Wechsel* (stock exchange, securities, bills of exchange)

<div align="right">(DWDS 2017a)</div>

The respective meanings of the word *Papier* are derived from context, as the following examples demonstrate:

(1) *etwas in Papier* (*ein*)*packen* (to wrap something in paper)

(2) *das Papier enthielt ein Verzeichnis der mitgeführten Bücher* (the document contains a list of the books that have been brought along)

(3) *der Spion hatte falsche Papiere* (the spy had false papers/fake ID)

(4) *ein gutes, schlechtes, wertloses Papier* (a good, bad, worthless stock/share)

How can one know which aspect of meaning is being referred to? Understanding words in context is possible through **collocations,** among other things. Collocations are semantically related words, which frequently appear in context with each other and so are retained together (Lipka 2002: 181). For example: the dictionary *Duden Online* (www.duden.de) lists the following linguistic units as combinational in content in the entry *Papier*:

– Adjectives *falsch* (wrong), *gültig* (valid), *intern* (internal), *handgeschöpft* (handmade)*, vertraulich* (confidential), *weiß* (white)

–	Verbs	*blättern* (leaf through), *bringen* (bring), *drucken* (print), *reißen* (tear), *kaufen* (buy), *rascheln* (rustle), *unterschreiben* (sign)
–	Nouns	*Bleistift* (pencil)*, Druck* (print*), Glas* (glas)*, Karton* (cardboard*), Leinwand* (canvas)*, Pappe* (paperboard)*, Stift* (pen)*, Tinte* (ink)

Let's now consider the English word *paper*, semantically equivalent to German *Papier*. The *Oxford English Dictionary* (OED, www.oed.com) lists for *paper* two entries, *paper* as a noun/adjective and *paper* as a verb. The German word *Papier* corresponds to the English word *paper* only in its nominal use. In the adjective use of English *paper*, German sets a derivative (*papieren*). In German there is no verb from the word family *paper*. For English *paper* as a noun, three main meanings are listed, with each main meaning carrying a varying number of sub-meanings. Overall, the main meanings are equivalent to those of German *Papier*. The different meanings appear in connection with the respective collocations. For example: *The paper used for this publication has been certified in accordance with the criteria of the Forest Protection Council*. (…) *Procedures for legalizing the situation of migrants without papers.*

It is the mental retention of prototypical meanings of common syntagmata as one large unit (of usual word combination) that enables us to understand meaning variations. These units make it possible to understand metaphoric usage of words such as using the German verb *werfen* (to throw) in the expression *Gedanken aufs Papier werfen* (literally: to throw thoughts on paper) (also see Chapter 3).

How words can be semantically joined in context is, therefore, not a purely syntactical matter. Understanding the relations between meanings depends more on certain semantic implications, which all words bear in themselves. The verb *leiten* (to lead)*,* for instance, bears the syntagmatic characteristic of an agent which "causes something to move" (translated from DWDS 2017b).

To be knowledgeable of the connection between semantics and morphology is important for prospective teachers. It helps to identify linguistic elements that carry meaning independently. Common knowledge would dictate that the smallest linguistic unit bearing meaning is the word. However, words can be comprised of even smaller elements. See for instance English

compounds such as *paper-fibre, paper-saving, paper-based.* The variety of word-segmentations can even be better demonstrated in the components of a random word family of German:

-   *Haus* (house), *Hausboot* (houseboat), *Hausbesetzer* (squatter), *Schneckenhaus* (snail shell, literally: snailhouse), *Behausung* (dwelling), *Häuslichkeit* (domesticity), *hausen* (to live in poor conditions), *häuslich* (domestic).

These words can be split into smaller segments. During the segmentation process, the structural differences between the individual representatives of the various word families become apparent.

-   *Haus*
-   *Haus-besetz-er*
-   *Schnecke-n-haus*
-   *Be-haus-ung*
-   *Häus-lich-keit*
-   *haus-en*
-   *häus-lich.*

This comparison reveals that, although words are indeed independent meaningful units, they are also comprised of smaller units, so-called morphemes. **Morphemes** are generally defined as the smallest meaningful linguistic units. The term 'meaning' is not reduced to lexical word classes such as nouns and verbs, but also encompasses morphemes, which bear grammatical functions. Afterall, in cognitive linguistics a grammatical function is also considered to be meaningful. Morphemes can express various meanings. The morpheme *-er*, on the one hand, when appearing in the word *Hausbesetzer* (squatter) conveys the meaning of an agent. On the other hand, in the word *Mitglieder* (members) it bears the grammatical function of a plural marker. In a similar way, the English morpheme *-s* can convey the meaning of possession in *Tom´s car* or it can function as a plural marker in *Best new cars for 2022*. A second in-depth comparative look reveals that different word meanings emerge through different morphological mechanisms. In the case of the word *Haus* (house)*,* the following examples show how images relay to possible mental representations of the respective words:

(1)	*Haus*	
		Figure 2.1: House (prefab Hartlhaus 2017)
(2)	*Haus-besetz-er*	
		Figure 2.2: Squatter (Wikipedia 2017a)
(3)	*Schnecke-n-haus*	
		Figure 2.3: Snail shell (Pixabay 2018)
(4)	*Be-haus-ung*	
		Figure 2.4: Dwelling (Katsiaryna EL-Bouz)

The images illustrate how the mental representation of a prototypical meaning of a word varies according to context. The syntactical role of the same word *Haus* (1) in the compound word *Hausbesetzer* (2) can lead to a mental representation of a squatter as the main reference (in which case *-er* serves as a sign of human agency). Here, the *Haus* (as the image shows) is part of the background. In reverse, the compound word *Schneckenhaus* (3) conveys an extremely specific image of a house, namely the calcium carbonate housing of a snail. The word *Behausung* (4) as a derivation of the word *Haus* invokes an abstract concept which is difficult to visualize. Though the portrayed image of *Behausung* shows the dwelling of an owl, this only serves as a representative example. There are many other possibilities of representing such an abstract concept visually.

The following section will deal with words and their constitution in greater detail. The section will focus on word elements (morphemes) used to derive new words from existing ones, thereby determining the word class of the new word, that is, grammatical morphemes that add grammatical features to a word without changing the word class.

In Section 2.1.2, words are discussed as potentially divisible elements. Section 2.1.3 is dedicated to lexical and contextual meaning. Section 2.1.4 deals with word formation while Section 2.1.5 deals with the segmentation of words into morphemes.

2.1.2   What Is a Word?

The writing style **scriptio continua** was in use until the 9th or 10th Century AD in old manuscripts and inscriptions. It was a writing style which has no word division. The letters of words and the words themselves were grouped together without spaces, punctuation marks, or the use of alternating lower- and upper-case letters.

The separation of words in texts was first introduced in the Middle Ages. The following text examples, one in the style of the scriptio continua and the other in a contemporary style, illustrates by comparison how word separation facilitates reading and understanding a random text:

Therewasonceaforesterwhowenti ntotheforesttohuntandasheentere dithheardasoundofscreamingasi falittlechildweretherehefollowedt hesoundandatlastcametoahightre eandatthetopofthisalittlechildwas sittingforthemotherhadfallenaslee punderthetreewiththechildandabi rdofpreyhadseenitinherarmshadfl owndownsnatcheditawayandsetit onthehightree.	*There was once a forester who went into the forest to hunt, and as he entered it he heard a sound of screaming as if a little child were there. He followed the sound, and at last came to a high tree, and at the top of this a little child was sitting, for the mother had fallen asleep under the tree with the child, and a bird of prey had seen it in her arms, had flown down, snatched it away, and set it on the high tree.* (*Fundevogel* (grimmstories.com, July 2023))

Table 2.1: An example of word separation typical for scriptio continua

The previous example elucidates how words are separated in written mediality via spaces. It is from this point onwards that words become tangible and can be defined as such, that is, as independent linguistic units. From a semantic perspective, however, the phenomenon of 'word' is more elusive. In general, a word is defined as a unit with autonomous meaning. What appears as a word in writing, however, does not always coincide with a linguistic element conveying a semantic core. This is the case with phrasemes. These are linguistic elements which consist of multiple words, whose meaning is derived from the syntagmatic unit en bloc, as a whole.

Examples:

- *in der Nähe von* (in the vicinity of)
- *der rote Faden* (the 'red'/common thread)

In Section 2.1.3 we will assume a basic equivalency of written word = word.

2.1.3 Lexical and Contextual Word Meaning: What Is in a Word?

The lexical meaning of a word is basically the definition of a word found in a dictionary (Weinrich 1993: 21). The dictionary definition represents an abstraction of the various meanings a word can assume in different texts. These are referred to as contextual word meanings (see below). Let us demonstrate contextual word meaning using the example of the German word *General*, which basically corresponds in its meanings to the English noun *general*.

As found in the *Großwörterbuch Deutsch als Fremdsprache* (Dictionary of German as a foreign language) the noun *General* conveys the following meaning: 'der höchste Offizier in einer Armee' (the most senior officer in an army) (Götz 2003: 412). The word *General* itself refers to a person with a certain trait. The designation *General* can also be conferred on a person without rank who exhibits the presumed traits of a General. How is one to know which usage of the German word *General* is being referred to? Nouns can only be syntagmatically linked with other linguistic devices to indicate a certain conceptual entity in texts. This is apparent when you observe the appearance of the German word *General* in authentic text samples (Foschi Albert 2012: 30):

(1) *Der General verkörpert Kontinuität* (The general embodies continuity) (heading)
18.07.2011 / *John Allen hat das Kommando über die Internationale Schutztruppe für Afghanistan* (*Isaf*) *übernommen* (John Allen has taken command of the International Protection Force for Afghanistan (Isaf)) (subheading)

(2) *General Winter schlägt in den USA zu.* ('General Winter' strikes in the USA.)

The expression *der General* in the title of example (1) refers to a person of the male sex who is named in the caption as *John Allen.* In this case, the reader can infer from context without difficulty that *General* refers to a military rank. This information is in accordance with common knowledge every individual possesses, a shared knowledge which leads to the prototypical representational model of the word. In example (2) (from a weather report) the word *General* is used in a figurative sense. Its features are used comparatively in order to describe the impact of the powerful American winters. The example shows how *General* can be used as an attribute of an entity which is not a person. The general meaning listed in the dictionary notes the most common usages of the word. The overall meaning of *General* is extracted from the individual contextual realizations of the word. It is a collective concept of attributes observed in prototypical human generals. In this case, the consensus is that generals are powerful and have great impact.

2.1.4 Word Formation

Word formation refers to the formation of new complex words on the basis of existing linguistic devices. This is achieved via different linguistic elements and can produce different word classes, which can be attributed to the different forms of conceptualization. For instance, the following words can be created on the basis of a simplex word such as the German *Glück* (luck/fortune):

Word formation (basis: *Glück*)			
Glücksfall (stroke of luck)	*glücklich* (happy, fortunate)	*glücklicher-weise* (fortunately, luckily)	*beglück-wünschen* (congratulate)
Beglückung (to make s.o. happy)	*glückbringend* (bringing joy)	*unglücklicher-weise* (unfortunately)	*glücken* (be successful)
Nouns	**Adjectives**	**Adverbs**	**Verbs**

Table 2.2: Word formation of the word *Glück* (luck/fortune)

Some of these examples consist of two constituents (*glück-lich*, *glück-en*) while others consist of three (*Be-glück-ung*, *be-glück-wünschen*). The formation *Glück-s-fall* consists of two constituents and a linking element, the linking -*s*-. *Glück-lich-er-weise* features three constituents along with the linking element -*er*-. *Un-glück-lich-er-weise* is constructed with four constituents and the linking element -*er*-.

A fascinating aspect of word formation is thus, that complex words express a complex overall meaning. Complex meaning is partially conveyed through the semantic properties that ascribe encyclopaedic knowledge to individual linguistic elements, and partially through possible meanings which are contained in respective word formation processes.

Example: compound noun *Apfelsaft* (apple juice) according to Ungerer & Schmid (1998):

Attributes of the word formation process *Apfelsaft* (apple juice)	Attributes of the word *Apfel* (apple)	Attributes of the word *Saft* (juice)
made from apples	round	made from fruits or vegetables

beverage, liquid	fruit	beverage, liquid
sweet, sweet and sour	sour, slightly sour, sweet	sweet, sour
in bags, in bottles	grows on trees	bottle, carton
yellow-green, brown	green, red, yellow	alcohol free
…	…	…

Table 2.3: Compound noun *Apfelsaft* (apple juice) (cf. Ungerer/Schmid 1998: 81)

Words are equipped with a specific meaning during word formation processes which functions as the semantic relation between the word elements. The semantic relationship between the base and the modifier in the word formation process (called **composition**), however, can be very different. Examples:

- *Autotür* (the door of a car): whole-part lexical relation
- *Kellertür* (door to the basement): relation provides information on a locality.
- *Winterfell* (fur, worn in winter): relation provides information on a time span befitting the character of the object.

The meaning of the compound is deduced by finding an appropriate relation between the meanings of the immediate constituents (Fleischer/Barz 2012: 69). Hence, establishing the relation when interpreting the compound relies in great parts on encyclopaedic knowledge. Unfortunately, such knowledge is not helpful when dealing with potentially ambiguous compounds (an example is *Silbertopf* (silver pot): A pot made of silver? A pot for storing silver?). These cases can only be judged through context (Schwarz/Chur 2007: 112).

Affixes also carry meaning and express certain relations. For example, the suffix -*less* as in *hopeless* or *meaningless* expresses the concept of 'missing'. But meanings cannot be attributed to affixes on a one to one basis either. For instance, a relation, such as the negative, can be expressed by not one, but several prefixes:

- *A-social*
- *il-legal*
- *mis-leading*
- *in-justice*

On the other hand, a suffix such as *-some* (as in *handsome* or *gruesome*) or *-able* (as in *manageable* or *capable*) can express several concepts and ideas.

2.1.5 Word Elements

As we have seen, words which are delimited in written text via spaces do not always represent the smallest meaningful elements. Many words can be disassembled into smaller meaningful constituents. Some of these parts can be used as independent words (free morphemes), others only appear as dependent parts of words (bound morphemes, affixes). In the following table, affixes (prefixes and suffixes) are underlined.

Glück-s-fall (stroke of luck)	*glück-<u>lich</u>* (happy, for-tunate)	*glück-<u>lich</u>-er-<u>weise</u>* (fortunately)	*<u>be</u>-glück-wünsch-<u>en</u>* (congratulate)
<u>Be</u>-glück-<u>ung</u> (happiness, joy)	*glück-selig* (blissful)	*<u>un</u>-glück-<u>lich</u>-er-<u>weise</u>* (unfortunately)	*glück-<u>en</u>* (to succeed)
Nouns	**Adjectives**	**Adverbs**	**Verbs**

Table 2.4: Word elements of the word field *Glück* (luck/fortune)

Word formation, together with the formal extensions of the word, leads to semantic changes in the core lexeme. In our example, the lexical meaning of the base word *Glück* is stated as "the result of the meeting of particularly favorable circumstances" in the *Großes Wörterbuch der deutschen Sprache.* (Dudenreaktion 1999: 1543) The connections between the various word formation elements result in new words. Some of these belong to other word classes. As seen in Table 2.4, new words derived from the original noun *Glück* include new nouns (1st column), adjectives (2nd column) as well as adverbs and verbs (3rd and 4th column).

The formation of new words primarily serves communicative purposes and can lead to the expansion of an existing language's vocabulary. All examples of the word forms of *Glück* cited up to this point belong to the standard vocabulary of the German language. They are so-called **lexicalized formations**.

A living language allows for the creation of new word formations, so-called **spontaneous** or **ad-hoc formations**, at any time. Ad-hoc formations are created in situations which require them for immediate communicative purposes and, if necessary, to compensate vocabulary deficiencies. If, after the first spontaneous use, these ad-hoc formations are not only used occasionally but on an increasingly regular basis by language users, they achieve the status of lexicalized expressions. These pass into the collective memory of language users, and some are added to dictionaries.

An example of a spontaneous formation based on the previous example with *Glück,* is *Glücksarchiv* (literally: archive of luck). This word designates the website of a non-profit project. The question 'What is luck?' is answered as follows on their overview page:

> Happiness is a millennia-old topic that has experienced a tremendous upswing in recent years. Thus, the *Glücksarchiv* tries to bridge the gap from the old philosophers to the latest currents of positive psychology. (Translated from Glücksarchiv 2017, Highlighting in the original)

When attempting to deduce the meaning of a spontaneous formation such as *Glücksarchiv*, neither everyday linguistic experiences nor dictionaries are helpful. Therefore, to aid comprehension, special strategies have to be put in use. The first strategy takes context into account (cf. Hepp 2012: 38-40). In our special case, a website is introducing itself as an archive. This is easily comprehensible, as the German word *Archiv*, can stand for a "geordnete Sammlung von [historisch, rechtlich, politisch belangvollen] Schriftstücken, Dokumenten, Urkunden, Akten" (ordered collection of [historically, legally, politically relevant] documents, records, deeds, files) (Dudenredaktion 1999: 286). Apparently, in this *Glücksarchiv 'Glück'* is collected. What exactly the term *Glück* is supposed to mean in this context is explained by the authors at a later point:

In the German language "Glück" as a term is very fuzzy, it has at least three different meanings, namely "Zufallsglück" (literally: coincidence-luck (luck)), "Wohlfühlglück" (literally: well-feeling-happiness (satisfaction)) and "dauerhaftes Glück" (permanent luck/happiness). When talking about "Glück", it is, therefore, advisable to reach an agreement with your conversation partners about what you mean by the term.

It also depends on the direction from which one approaches the term "Glück". Psychologists have a different understanding of "Glück" than philosophers, and pedagogues, theologians and economists also define the term "Glück" in their own way. Fortunately, all perspectives are shown here in the *Glücksarchiv*. (Translated from Glücksarchiv 2017)

The reader deduces from context what the term *Glücksarchiv* means by utilizing their encyclopaedic and (lexicalized) language knowledge.

The second strategy involves analyzing the individual constituents of a new word and the way they are joined together. As already noted, the individual constituents can function as independent words. This is the case with our example *Glücksarchiv*. When independent words are joined, the meaning of the newly formed word is generally not difficult to deduce.

When affixes occur in a word, recognizing how the word was formed is a decisive clue for gauging the meaning of a new word. By adding suffixes, for example, nouns can be shaped into adjectives, in this case the word *glück-lich* which is used attributively ('*mit Glück behaftet*' (attached to luck)) or, in other cases, to describe traits (*menschlich – 'wie ein Mensch'* (humane – 'like a human')). To offer up yet another example, adverbs can be formed from adjectives (example: *glücklich – glücklicherweise* (lucky, fortunately)) and so on.

In complex German words, we distinguish between different morphological word formation products based on the type of building blocks present. You will become more familiar with the various word formation processes in the next chapter.

2.1.6 Summary

- Morphological phenomena are traditionally treated as classifying aspects ('study of the structure and formal characteristics of a language').
- The perspective of cognitive linguistics unveils the connection between morphology and semantics and the relationship between linguistic structures and conceptualizing processes.
- Aspects of meaning contained in morphological phenomena can be illustrated especially vividly using words formed from other words (new word formations as well as word changes) but also using simple words (simplex forms).
- What appears in writing as a word is not always congruent with a linguistic element conveying a semantic core. Linguistic elements which consist of several words convey meaning only as a syntagmatic unit as a whole (phrasemes).
- In context, aspects of a word's meaning can be discovered, especially through semantically related words: so-called collocations.
- Knowledge of the connections between semantics and morphology is important for prospective teachers. It is useful in identifying linguistic elements which bear autonomous meaning.

2.1.7 Review Questions

1. What is morphology?
2. What is semantics and what is its connection to lexicology?
3. Why are collocations useful for decoding the true meaning of a word?
4. What are the characteristics of words in written language?
5. Into what smaller units can compound words be parsed?
6. What do you know about the meaning of affixes?
7. What are the uses of spontaneous or ad-hoc word formations?

2.2 Compounding and Derivation

Marina Foschi Albert & Marianne Hepp

In the first part of this chapter, you learned that words are not always the smallest meaningful unit of a language in the conventional sense. They are composed of smaller constituents which are also meaningful. These can also be separated into even smaller constituents. You have also seen how the term 'meaning' is descriptive on a lexical as well as a grammatical level in cognitive linguistics: an example is the concept of 'missing – fehlen', which can be expressed via the morpheme *-los/-less*. We discussed the possibility of creating new words from the existing language inventory of a living language. This type of word formation is utilized regularly and thereby increases the vocabulary listed in dictionaries. The meaning of such ad-hoc formations – in fact the meaning of all words in a conventional sense – is determined by the recipient utilizing two main strategies: 1. by considering the context in which the word appears; and 2. (in the case of lexemes formed using whole words) by examining the individual constituents and by analyzing the respective processes of word formation. Cognitive linguistics regards the area of word formation in a similar fashion. From a cognitive linguistic perspective, complex lexemes are decoded by the listener and reader, or by the creativity of the speaker or writer when creating new lexemes to encode new concepts or designate new referents (Lipka 2002: 95, 108). We are going to use this chapter as a window towards discovering the first disparities between the perspective of classic linguistics and the perspective of cognitive linguistics. Also, we are going to give you an overview of the main similarities and differences between the two approaches. As a collateral effect, this chapter uses examples from different languages, mainly English and German. This will allow you to understand better the situation of a learner acquiring a foreign language while your knowledge of English will help you to identify structural differences to related languages.

Study Goals

By the end of this chapter, you will:
- be familiar with the most important word formation processes

- learn why derivation and compounding are the most important word formation processes in the German language
- understand how newly formed words are attributed to meaning.

2.2.1 Word Formation

The present chapter explores the constant expansion of vocabulary through word formation. Word formation is different from word creation which is the invention of all new word stems. Many examples of word creation are collected in the online *Dictionary of Nowadays Language* (*Wörterbuch der Jetztsprache Sprachnudel* (http://www.sprachnudel.de, October 2022)).

In contrast to word creation, word formation uses existing lexical material in order to create new words (Fleischer/Barz 2012: 18–19). As we will see, there are differences in how word formation is viewed in classic linguistics and how it is regarded in cognitive linguistics. Classic linguistics differentiates between word formation and so-called transfer of meaning or metaphorization. Cognitive linguistics does not distinguish between the two. We will illustrate how this distinction was abandoned in cognitive linguistics by means of the process of conversion (see Section 2.2.2.5).

Word formation is mainly concerned with assembling building blocks – constituents – which are already available. The main goal is to expand the dictionary.

Constituents of word formation include the following units:

- independent words
- affixes of word formation (prefixes, suffixes, and circumfixes)
- forms which only appear in combination with other morphemes (for instance *geographic*, *xenophil*)
- letters (*child – children*)
- unique units (for instance *rasp-berry*)
- phrases (for instance *the low emission vehicle lane*)
- linking elements (such as *-n-*, *-e-*, *-er-*, *-s-* in German).

The expansion of the vocabulary takes place through different processes. The most prominent of these will be presented in an exemplary fashion in

the following brief overview. Subsequently, the formation processes compounding and derivation will be presented in greater detail.

2.2.2 The Most Important Word Formation Processes: An Overview

The following list includes word formation processes of the German language recognized by traditional linguistics. These word formation processes are used frequently and allow for the creation of new formations (Hepp 2012: 15). They are as follows:

- compounding
- derivation
- clipping (or truncation, shortening)
- word formation of verbs that form a syntactic 'bracket'-structure, known as 'Klammer'
- conversion
- blending.

2.2.2.1 Compounding

The formation of complex words consisting of at least two lexemes is called **compounding**. Compounding may appear in nouns, adjectives, verbs, adverbs, and prepositions but mainly serves the expansion of the two-word classes noun and adjective. The compound consists of an autonomous base and a modifier which provides the necessary specification of the base. Both are connected through a linking element. Example:

Wissenschaft (science)	*s*	*sprache* (language)
hilf (help)	*s*	*bedürftig* (needing)
Modifier	**Linking element**	**Base**

Table 2.5: Autonomous bases and modifiers of compounds

Linking elements (*-n-, -s-, -es-, -e-*) are more frequent in German word formation than in other languages. The English language only uses *-s-* in a few cases (for instance *sports car*).

In the case of complex compounds, the modifier and the autonomous base already consist of compound elements (*Wissen-schaft-s-sprache*). Formations such as these are found in specialist jargons but also represent a characteristic feature of general German word formation. The more extensive a compound is, the more the meaning of the noun is restricted, as the following example shows:

Gesetz	any law
Arznei-mittel-gesetz	a law concerning pharmaceuticals
Arznei-mittel-aus-gaben-begrenzung-s-gesetz	a law concerning the limitation of expenditure on pharmaceuticals

Table 2.6: Restriction of noun meaning

2.2.2.2 Derivation

Derivations are formed with a lexeme and a morpheme. In these cases, the lexeme functions as the independent base form. The morpheme, a prefix or suffix, produces the derivation. For example:

Gestein →	*Ge-*	*stein*
rocks	This prefix conveys the meaning of collectiveness.	*stone*
unsicher →	*un-*	*sicher*
uncertain	This prefix conveys the meaning of negation, similar to English.	*certain*

versprechen → *to promise*	*ver-* The function of the prefix in this case is to alter the meaning of the verb, pointing out the effect of the action expressed by *sprechen*.	*sprechen* *speak* (verb)
	Prefix	**Base form**
Techniker → *technician*	*Technik-* *technic*	*er* This suffix marks the semantic role of the agent.
lesbar → *readable*	*les-* root of the verb *lesen* (*read*)	*bar* This suffix, similar to English *-able*, conveys the meaning of 'being able to'.
radeln → *to take a bike ride*	*rad-* *wheel*	*eln* This suffix alters the grammatic function of the word, transforming a noun into a verb. In English derivate verbs were gradually replaced by particle verbs.
	Base form	**Suffix**

Table 2.7: Derivation

Circumfixes also occur in the form of *Ge-mäld-e* (paint-ing)*, ge-füg-ig* (sub-missive), *er-kund-ig-en* (in-quire).

Derivation affects all main word classes: nouns, adjectives, verbs, and adverbs. The German language possesses a relatively limited inventory of derivational morphemes. Despite that, these derivational morphemes can be combined in countless ways.

Analyzing the morphological structure of derived words is considered controversial in the cognitive process of meaning construction. Questions in need to be solved include: how would the semantic construction work? In what ways does a word receive meaning through its morphological structure? From a cognitive linguistic perspective, lexical and grammatical elements contribute equally to the deduction of meaning (Deppermann 2002). Linguistic elements can only build a cognitive structure (**figure** or **profile**) on the basis of a conceptual background (**ground** or **base**). A classic example is the mathematical term *hypotenuse*. The hypotenuse is the longest side of a right triangle. Without the conceptual base of the right triangle, the hypotenuse would have no cognitive profile and could, therefore, not be defined. The concept of the hypotenuse cannot be understood without proper knowledge of the concept or idea of a triangle.
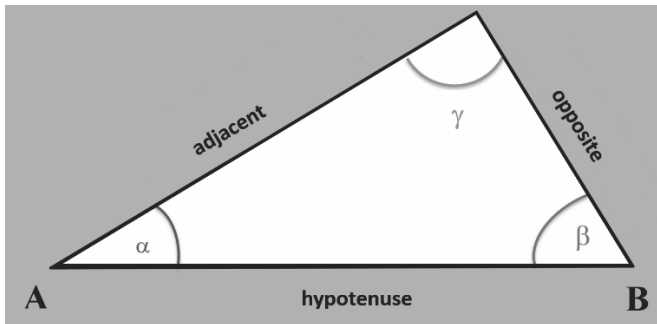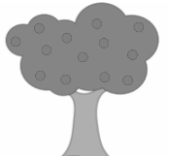
Figure 2.5: Concept of a hypotenuse (own illustration)

Meaning results from the contrast between the profiled element and the conceptual background relevant to the situation (Langacker 1987: 163). The figure contrast or ground contrast can be used for words during their syntactic interaction with other words. It can also be used for word formation. It can be assumed that, during the cognitive process of deriving words such as *Politiker* (politician)*, Lehrer* (teacher), *Hörer* (listener)*, the

semantic effect of the suffix *-er* as an agent is exacerbated by its interactions with the profile *Politik* (politics). The interaction of the agent concept with the lexical concept underlying the word *Politik* leads to the conceptualization of the word *Politiker*. While these conceptualization processes appear plausible for words such as *Politiker*, the compoundability of words such as *Computer* (computer) and *Korkenzieher* (corkscrew) is usually not as apparent (Ungerer 2007: 654). From a cognitive point of view, not all complex words are the same. In fact, there are formations which have undergone an intense process of lexicalization, ultimately merging their constitutive elements to a single new semantic unit. The more advanced the lexicalization process is, the more relevant is the listener's/reader's morphological analysis of word formation for constructing meaning. Understanding complex words works in the same way as understanding simple words: it is a contrasting process of constructing meaning which can be viewed as a semantic extension of a prototypical pattern. In order to understand the word *Politiker,* the semantic backgrounds of *Politik* and *-er* needs to be prototypically invoked. The distance from the prototype does not always correspond with the complexity of the word structure, as the following table shows (loosely based on Ungerer 2007: 653). *Lorbeer* (laurel) and *Apfelbaum* (apple tree) are compounds, for instance, though the former (latin *laurus + beer* (berry)) has already been lexicalized. *Lorbeerbaum* (laurel tree) and *Apfelbaum* (apple tree) are tree species which exhibit varying distances to the prototype, as the table displays iconographically. Some simplex words actually exhibit a greater distance to the prototype than complex words. This is, for instance, the case with the word *Baum* (tree) when it is used as an abbreviated designation of a mathematical tree diagram (cf. Table 2.8). The expression *mathematischer Baum* (mathematical tree diagram) refers to a graphical representation which has nothing in common with woody plants, apart, perhaps, from the connecting lines contained in the graphic which are reminiscent of the twigs and branches of woody growths. The distance of the prototype *Baum* – referring to trees – is smaller than in the case of the compound verb *aufbaumen auf + Baum* (to build a tree-like structure/*aufbäumen* = to rear). The same applies to the compound *baum + art* and the derivational element *-ig* used to create the adjective *baumartig* (tree-like).

Cognitive prototype		
 Figure 2.6: Tree (ClipProject 2017a)	*Baum* (tree)	„Holzgewächs mit festem Stamm, aus dem Äste wachsen, die sich in Laub oder Nadeln tragende Zweige teilen" (Dudenredaktion 2017a) (a woody perennial plant, typically has a single stem or trunk that grows to a considerable height and bears lateral branches at some distance from the ground which carries pine needles or foliage)

Semantic extensions			
 Figure 2.7: Appletree (ClipProject 2017b)	*Baum* (tree)	⟹	*Apfelbaum* = „rötlich weiß blühender Obstbaum mit Äpfeln als Früchten" (Dudenredaktion 2017b) (a fruit tree that blooms with reddish white flowers and bears apples as fruit)
 Figure 2.8: Laurel (fructusterrum 2023)	*Baum* (*tree*)	⟹	*Lorbeer* = „immergrüner Baum mit ledrigen (getrocknet als Gewürz dienenden) Blättern, gelblich weißen Blüten und blauschwarzen Steinfrüchten" (Dudenredaktion 2017c) (Laurel = an evergreen tree with leathery leaves (used as herbs when dried), yellow-white flowers and bluish-black stone fruit)

	Baum (*tree*)		*aufbaumen* = „(von kletternden Wildtieren und Vögeln) auf einem Baum sitzen" (Dudenredaktion 2017d) ((referring to tree-climbing wild animals and birds) to sit on a tree)
	Baum (*tree*)		*baumartig* = „einem Baum ähnlich, wie ein Baum aussehend, wirkend" (Dudenredaktion 2017e) (similar to a tree, tree-like)
  Figure 2.9: Tree diagram (Bettermarks 2017)	*Baum* (*tree*)		*Baum* = „mathematischer Graph mit Knoten und Kanten" (Dudenredaktion 2017a) (mathematical graph with vertices and nodes)

Table 2.8: Distance from the prototype according to Ungerer (2007: 653)

You will learn more about meaning deduction and the concept of mental construction in Chapter 7.3.

2.2.2.3 Clipping Formation

Clippings are created by reducing a longer full form. They can be separated in three main categories: 1. **complex** clippings; 2. **unisegmental** clippings, consisting of the first or last segment of the full form; and 3. **partial clippings**, consisting of an abbreviated or unchanged segment (Fleischer/Barz 2012: 277–279).

Type of clipping			Examples	Unabbreviated word
1.	**Complex clippings**	**Initialisms** **Acronyms**	*DAX*	*Deutscher Aktienindex* (German stock index)
		Syllabic abbreviation	*Kita*	*Kindertagesstätte* (day nursery/kindergarten)
		Mixed clippings	*Azubi*	*Auszubildender* (trainee/apprentice)
2.	**Unisegmental clippings**		*Euro*	*European Currency Unit*
			Cello	*Violoncello*
3.	**Partial clippings**		*CBS-report*	

Table 2.9: Types of clippings (in accordance with Hepp 2012: 21)

Clippings do not produce new words, but synonymic word varieties. Lists of abbreviations in various dictionaries aid in decoding unknown abbreviated forms. Context is the most helpful tool when it comes to decoding clipping formations. The meaning is either explained, or the unclipped form appears alongside the clipping or is paraphrased (cf. Fleischer/Barz 2012: 277). As communication is increasingly globalized clippings become increasingly widespread as a means in international communication.

2.2.2.4   Word Formation in Verbal Bracket Constructions

Verbal brackets in German can be composed of various constructions, such as temporal constructions consisting of auxiliaries and main verbs, or modal constructions consisting of modal verbs and main verbs. Commonly, a verbal bracket in a German sentence can also consist of the stem or base of a main verb and a particle such as in *komme ... an* (arrive), *fahre ... ab* (drive off), *esse ... auf* (eat…up). Such constructions produce a lexical bracket consisting of a verb and a particle. The main process of German verbal word formation allows a simple verb structure to join with an

additional lexeme to form a two-part verb. This enables the verb to form a lexical bracket (for example *stehe ... auf* (stand up)). The verbal base can be semantically determined by a preposition, an adverb, a verb in the infinitive form or an adjective. The quantity of possible verbal form outcomes depends on how generic the meaning of the basic verb is. Generic verbs such as *geben* (give), *legen* (put), *liegen* (lie), *machen* (make), *nehmen* (take), *setzen* (put), *sitzen* (sit), *stellen* (put), *stehen* (put/stand), *treten* (step) can be joined by a great variety of lexical forms (cf. Weinrich 1993: 1032–1034). See for example the way the verbal bracket *stellt ... aus* looks within a sentence:

Welcher Arzt	*stellt*	*das notwendige Attest für Berufssportler*	*aus*?

verbal base   particle

(Which doctor issues the necessary medical certificate for professional athletes?)
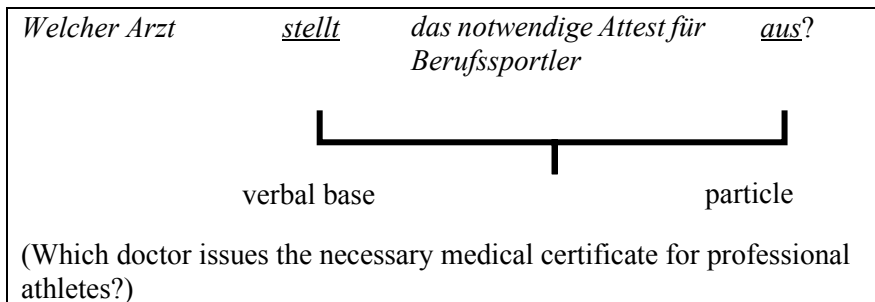
Figure 2.10: Example of a verbal bracket with the verb base *stellen* (own illustration)

There are often significant differences in meaning between a simple verb such as *stellen* and the same word combined with a particle in a compound (cf. Blühdorn/Foschi 2012: 127). The meanings of the new verbs are not always transparent, as the meaning of particles and verb bases merge into the overall meanings in very different and unpredictable ways. This is especially apparent when we combine the simple verb *stellen* (put) with several particles and then look up the results in the dictionary:

- *stellen*   'sich an einen bestimmten Platz, eine bestimmte Stelle begeben und dort für eine gewisse Zeit stehen bleiben' (to go to a certain place, a certain spot and stay there for a certain time)

- *abstellen*   'an einen sich gerade anbietenden Platz stellen' (to leave s.th. in a nearby place)

- *anstellen* 'etwas an etwas stellen, lehnen' (to put or lean something to/against something)

- *aufstellen* 'in einer bestimmten Ordnung o.Ä., an einen vor-gesehenen Platz stellen, hinstellen' (to put some-thing in a certain place in a certain order)

Verbs which have been formed via other word classes, such as *sicherstel-len* (ensure/confiscate) via the adjective *sicher* (sure), are more transparent. The meaning of the new verb emerges from the easily understood mean-ings of its two separate parts:

- *sicherstel-len* 'in behördlichem Auftrag beschlagnahmen, vor un-rechtmäßigem Zugriff oder die Allgemeinheit ge-fährdender Nutzung sichern' (confiscate on behalf of authorities, secure against unlawful access or use that endangers the general public)

In combination with certain expressions, such as *in Rechnung stellen* (to invoice), the meaning of the verb *stellen* fades. The noun *Rechnung* (ac-count) is the main contributor to the overall meaning of the phrase *berech-nen* (calculate).

2.2.2.5 Conversion

Traditionally, the term **conversion** describes the creation of new words by transposing a word into another word class. So-called **pure conversion** (to be distinguished from **prefix conversion** which has been classified as der-ivation here) is a change of word class that takes place without affixation; that is to say, without a derivational morpheme. The most productive type of conversion is the conversion into a noun. Verbs are the main basis of a noun conversion whereas verb's infinitive form is converted into a noun in a noun group (cf. Weinrich 1993: 981).

Examples:

- *schreiben* (to write) → *das Schreiben* (the writing)

- *veruntreuen* (to embezzle) → *das Veruntreuen* (the embezzle-ment)

Nominalization can also take place with adjectives (*blau* (blue)→ *das Blau, golden* (golden) → das *Goldene*) as well as adverbs (*das Hier und Heute* (here and now)), prepositions (*das Für und Wider* (the pros and cons)), conjunctions (*das Wenn und Aber* (ifs and buts)).

Cognitive linguistics does not consider conversion to be a word formation process either, as it is not a process which changes the phonological form of the words (cf. Ungerer 2007: 651). Rather, cognitive linguistics views conversion as a purely semantic process of metaphorization or metonymization. Metaphorization is generally viewed as a process in which one level of meaning is transferred to another level. In that way, the meaning of *here* in the sentence *Here comes the sun* serves the purpose of determining the temporal point of the onset of the rising of the sun (present day or historical present). On the other hand, the meaning of 'limited time span of the present' in the nominal phrase *The here and now of our being* is made into an absolute and turns into a synonym for *the present moment*. Conversion produces a higher level of abstraction often coupled with an expansion in meaning. This is the reason why conversion is commonly found in literary texts, especially in poetry.

Experiment

In the following example, the color adjective *gold* in the poem *Rondel* by Georg Trakl ([1913] 1972:14) changes through the word formation process of conversion from an attribute to an independent concept. With the help of the English translation, try to outline the possible meanings which the expression *das Gold* conveys in the poem. How can these possible meanings be explained from a cognitive linguistic perspective?

Verflossen ist das Gold der Tage,
Des Abends braun und blaue Farben:
Des Hirten sanfte Flöten starben
Des Abends blau und braune Farben
Verflossen ist das Gold der Tage.

(*Flown away is the gold of days,*
The evening's brown and blue colors:
The shepherd's soft flutes have died,

> *The evening's blue and brown colors;*
> *Flown away is the gold of days*.)

(English translation: http://www.literaturnische.de/Trakl/english/ged-e.htm, August 2023)

2.2.2.6 Blending

In the German language, word groups being in syntagmatic relation to each other can be compressed to create new words (cf. Eichinger 2000: 31). **Blending** can be viewed as a special case of compounding, due to the fact that a syntactic group is compressed into a new word or into a compositional link of a new word while maintaining word order and eventual inflected relational morphemes.

Even though blending in German occurs only rarely the process displays growth potential, e.g. in the area of web-based communication (Foschi/Hepp 2012: 111). For example, a new history page of the German magazine *Spiegel online* has been called "*einestages*" (*onceuponatime*).

New compounds can originate from word groups which have been compressed in this fashion (Example: *einestages-Zeitgeschichte* (literally: once upon a time – contemporary history), https://de.wikipedia.org/wiki/Einestages).

2.2.3 Central Word Formation Processes in the German Language: Compounding and Derivation

The two central word formation processes in German are compounding and (explicit) derivation. They are both combinational processes. German is a language with an affinity towards compounding in general: it is *kompositionsfreundlich* (compound-friendly*)*. In order to assess the creativity potential a comparison with languages that are considered *kompositionsschüchtern* (compound-shy), such as Romance languages (Donalies 2011: 37), might be instructive. The veritable delight of the German language in compounding – impressively demonstrated with the use of the two words *kompositionsfreundlich* and *kompositionsschüchtern* – can be found in a variety of text types.

2.2.3.1 Compounding in German

The technical term *Arzneimittelausgabenbegrenzungsgesetz* is the title of a juridical text dealing with a law limiting the prices of pharmaceuticals (Hepp 2012: 17). The complex compound was generated from the noun *Ausgaben* (expenses) plus the prepositional syntagma *für Arzneimittel* (for pharmaceutica). The subtitle, *Gesetz, das die Ausgaben für Arzneimittel begrenzt* (law for reducing the cost of medication) can be seen as a paraphrase of the compound.

The potential of compounds for synthetization and compression is most apparent when compounds form nouns: their dominant role, diversity and productivity in word formation is unparalleled by any other word class (Fleischer/Barz 2012: 117).

Nouns are often used in compound adjectives where they appear as the modifier of the compound while the adjective functions as the base. Examples are *himmelblau* (sky-blue), *flaschengrün* (bottle-green), *geheimnisvoll* (mysterious, literally: mystery-full). Noun-adjective compounds are relatively unrestricted in their productivity and allow for many ad-hoc formations, as do noun compounds. A spontaneous formation such as *nusstortenbraun* (nutcake brown), therefore, is completely possible. This ease is also due to the fact that such compounds conform seamlessly with already existent series of formations (cf. Table 2.10):

(1)	*steinalt*	'*alt wie ein Stein, sehr alt*' (as old as a stone, very old)
(2)	*lammfromm*	'*fromm wie ein Lamm, sehr fromm*' (as meek as a lamb, very meek)
(3)	*aschgrau*	'*grau wie Asche, intensiv grau*' (as grey as ash, intense grey)
(4)	*rubinrot*	'*rot wie ein Rubin, intensiv rot*' (as red as a ruby, intense red)
(5)	*strohblond*	'*blond wie Stroh, sehr blond*' (as blonde as straw, very blonde)
(6)	*haselnussbraun*	'*braun wie eine Haselnuss, intensiv braun*' (as brown as a hazelnut, intense brown)

Table 2.10: Noun-adjective compounds

The noun-adjective compounds listed in the table all contain a semantic transfer which can be subsumed under a standard typology: The adjective (for instance *steinalt*) refers to a quality (*alt* (old)). This quality is specified or intensified and explained via a prototypical semantic characteristic of a noun. In this case, the meaning is *sehr alt*, *uralt*, (age old/very old, ancient) in accordance with the common belief that stones exist for ages and cannot experience death in a biological sense.

As we demonstrated using the example *Glücksarchiv* in the previous chapter (Section 2.1.5), so-called spontaneous or ad-hoc formations are created in situations which demand them for imminent communicative purposes and potentially for a compensation of vocabulary deficiencies. In the case of literary texts very specific stylistic requirements are met.

2.2.3.2 Derivation in the German Language

During explicit derivation words may be combined with affixes. Derivation affects all main word classes: nouns, adjectives, verbs, and adverbs. It follows a basic principle: The unit on the right determines the grammatical characteristics while the left specifies the word semantically. The following table shows compounds and derivations in comparison:

Compounding			Derivation		
hoch high	*Haus* house	*Hochhaus* skyscraper	*freundlich* friendly	*keit*	*Freund-lichkeit* friendli-ness
Adjective	**Noun, singular, neuter**	**Noun, singular, neuter**	**Adjective**	**Suffix**	**Noun, singular, feminine**
haus	*hoch*	*haushoch* as tall as a house	*Freund*	*lich*	*freundlich* friendly
Noun	**Adjective**	**Adjective**	**Noun**	**Suffix**	**Adjective**

Table 2.11: Compounding and Derivation

The most common German negative prefix is *un-*; when used in a noun it results in formations such as *Unwetter* (bad weather/storm), *Unkraut*

(weeds), *Unsummen* (vast sum). When used with an adjective it produces words such as *unwichtig* (unimportant), *unschön* (unpleasant), *unrein* (impure).

Verbal prefix derivations (prefixation) such as *bemalen* (to paint), *erblühen* (to blossom), *verleihen* (to award), *zerreißen* (to tear) and so on are traditionally called inextricably linked verbs. The derivational element (lexeme and morpheme) is melted with the term. As a result, in contrast to the formation of verbs via a lexical bracket (for instance *komme ... an*) prefix and verbal stems are never separated.

In the case of suffixation, on the other hand, the stem lexeme or the base form is positioned before the derivational morpheme (in this case a suffix). By this rule, all nominals ending with *-ung* (*die Zeitung, Anerkennung, Wohnung* (newspaper, recognition, dwelling)) ending on *-erei* (*die Druckerei, Türkei* (printer, Turkey)), *-heit*, *-keit* and *-igkeit* (*die Ernsthaftigkeit, Glaubhaftigkeit* (sincerity, credibility)) are classified as feminine while all nominals derived from verbs and ending in *-er* are classified as masculine (*verlegen – der Verleger, denken – der Denker* (to publish – publisher, to think – thinker)). By adding the suffix *-in*, the previously listed nominals' gender is inflected and reassigned to the feminine gender (*die Verlegerin, Kanzlerin, Musikantin* (the (female) publisher, chancellor, musician)).

2.2.4 Summary

- Living languages are not static entities but in a state of constant change. While some words move towards obsolescence other words in existence are simultaneously equipped with new meanings. Mainly new words contribute to the constant and necessary expansion and development of the lexicon.

- In contrast to the processes of metaphorization and word creation (the formation of new word stems which occurs much more rarely) word formation uses existing lexical material to create new words from existing constituents.

- The meaning of word formations can be deduced through the analysis of the respective word formation processes of the individual formation constituents (motivation and transparency) or by taking context into account. Connecting these two approaches makes establishing meaning more precise.

- Complex lexemes are decoded by the listener and readers or the creativity of the speaker or writer when creating new lexemes to encode new concepts or designate new referents.
- From a cognitive linguistic perspective, lexical and grammatical elements contribute equally to the determination of meaning. Language elements can only form a cognitive structure (figure or profile) on the basis of a conceptual background (ground or basis).
- Meaning results from the contrast between the profiled elements and the conceptual background relevant to a situation.
- Understanding complex words is similar to understanding simple words. It can be viewed as an extension of prototypical patterns. These patterns are determined by the semantic backgrounds or prototypes.

2.2.5   Review Questions

1. What is the difference between word formation and word creation?
2. Which word formation processes do you know of?
3. What parts constitute a compound?
4. Explain the cognitive process that underlies the meaning construction of a derivation such as *village-r*.
5. Which main types of clipping formation are there? Name an example for each.
6. How does cognitive linguistics interpret the word formation process of conversion?
7. What are verbal prefix derivations and how can they be distinguished from verbs capable of forming lexical brackets?

3   Linguistic Imagery

It is astounding to see how important the role of images is in our mind. Not only in terms of modern media (**visual turn**) but also in the realm of language. As imagery in language is so prevalent in everyday lives the present chapter will concentrate solely on language imagery and its special role in cognition and language acquisition. To illustrate the prevalence of images in language, let us look at a couple of expressions such as *to solve a problem* or *to break someone's heart.* If we took the expressions at face value, we would have to expect a chemical experiment on an issue (in the sense of the dissolution of something in an acidic solution) or a physical assault on someone's heart.

In the first part of the chapter, we will explore how such metaphors and metonymies work and how traditional linguistics describes and explains these phenomena. Subsequently, we will discuss cognitive mechanisms fundamental to the ubiquitous imagery use in language We will also elaborate on metonymy, a linguistic element quite similar to metaphor. The conceptual metaphor theory will be presented and compared with the traditional (literary) perspective on metaphors. We will touch on the conceptual metaphor's ability to represent mappings between cultural domains, and we will address the role of imagery for the way we think. It will be shown how abstract concepts can be understood through images. Finally, we will explore the role of imagery with respect to the processes of knowledge construction, knowledge representation and knowledge storage in a learner's mind.

3.1 Linguistic Imagery and the Conceptual Metaphor

Natalya Furashova, Moiken Jessen & Katsiaryna EL-Bouz

Sometimes, people are not straightforward with what they mean to say, and – on the other hand – words are not always used to express their literal meaning. We could, for instance, say about a person that *he is cunning* or *clever*. But instead, we say *He's (sly as) a fox*. We harbor certain mental images (such as a mental image of a fox) and use them to speak about different things. The transfer entails a special effect which originates from linguistic imagery.

Linguistic imagery is mainly achieved by metaphors and metonymies. These used to be viewed as primarily rhetoric tropes and, therefore, appeared to be of relevance primarily to rhetorics and to literature rather than to linguistic research. Furthermore, they were viewed as purely stylistic phenomena.

This chapter focuses on metaphors and broadens the traditional understanding of metaphors using research results of cognitive linguistic studies. According to these results, metaphors are an expression of our intellectual abilities and, therefore, constitute the cognitive foundation of language. They exhibit a regular, systemic character and embody a conceptualizing mechanism, or in other words, a pattern of thought.

Study Goals

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

- explain the most important types of figurative language
- recognize different aspects of transmitting meaning
- comprehend the difference between metaphor and metonymy from the perspective of traditional linguistics
- gain a first impression of the metaphor as a cognitive, conceptualizing mechanism which structures language.

3.1.1 The Basics: Types of Imagery-Based Languages

Using words in a non-literal sense was part of the art of oratory (rhetorics) in antiquity. Especially in ancient Greece, speeches were embellished and endowed with impressive imagery to attain certain effects, impress the audience, and make statements more powerful. Back then, the art of oratory meant speaking effectively. This was how free men with the right to vote were won over for certain political decisions and court rulings. An educated speaker had a lot of influence, power, and wealth back then.

Imagery-based expression is still found today in poetry and literature. In literature, there is evidence of the poets striving "for innovation, originality and uniqueness in linguistic expression" (translated from Schwarz/Chur 2004: 108). Figurative, imagery-based word use was mainly of interest to rhetorics and literature for these reasons.

On the other hand, Schwarz & Chur (2004) describe the role of metaphors in linguistics as follows:

> In early semantic theories metaphors were explained as semantic deviations (so-called **anomalies**). It was believed that metaphors are created by combining words that are incompatible due to their semantic characteristics. As a result, *abyss* was considered a concretum and *despair* an abstractum. From the point of view of linguistic selection rules, however, the direct connection of abstract and concrete reference areas (*She plunged into an abyss of despair)* is not possible. (Translated from Schwarz/Chur 2004: 107)

For researchers, the focus of interest, therefore, initially shifted from speech to the linguistic system. They realized that applying names and words to seemingly different contexts was extremely common and in accordance with regular systematics. This type of usage penetrates our languages and for this reason is of interest to linguistic research. Hence, research was conducted on the regularities of the non-literal use of words in two areas: metaphor and metonymy.

3.1.1.1 Metaphors as a Transfer of Denotata

Traditionally, the term **metaphor** is considered to mean a transfer of a name, i.e. a word due to (mostly superficial) similarities from one **denotatum** to another. The denotatum is the object or context the speaker refers to and it belongs to extralinguistic reality. The following examples illustrate extralingual similarities:

(1)

similar coloring

fox
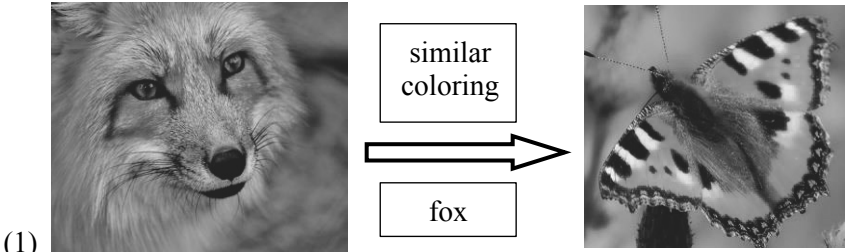
Figure 3.1: Similar coloring (Pixabay 2017)

(2)

similar shape

dish
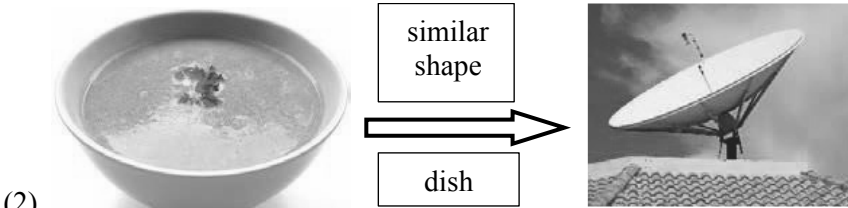
Figure 3.2: Similar shape (Pixabay 2017)

(3)

similar function

legs
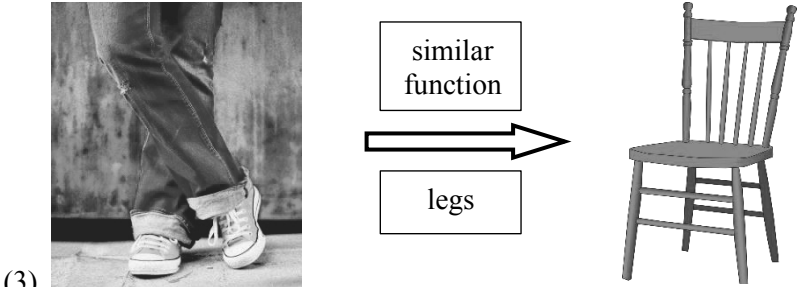
Figure 3.3: Similar function (Pixabay 2023)

(4)
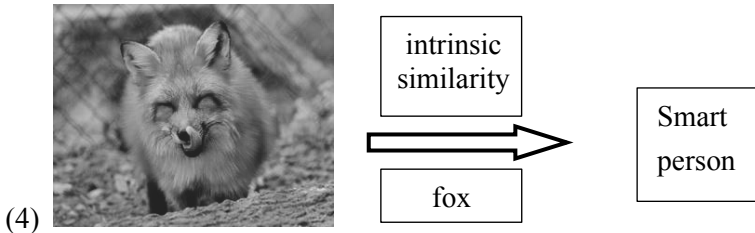
Figure 3.4: Intrinsic similarity (Pixabay 2017)

Words attain new meanings via these transfers and can become polyse-mous. This is the reason why metaphors are mainly researched in connec-tion with polysemy (compare Chapter 4.1).

Researchers originally assumed that these similarities were simply caused by the nature of things and that certain aspects were fixed in certain lan-guages. This assumption was corroborated by the similarity of the meta-phoric transmission of denotations in various languages. The figurative meanings of the words depicted in the above images (2), (3) and (4) are typical for German, English, and Russian (and most likely for several more languages). But there are also differences between languages in terms of the transfer of denotations. An example of such a case is the metaphoric transfer of the German word *Birne* (pear) from the fruit to a light bulb (*Glühbirne*) and also, (colloquially) to the human body part *Kopf* (head). This mapping does not exist in English or Russian. These types of transfers were also discussed in traditional metaphor theory.
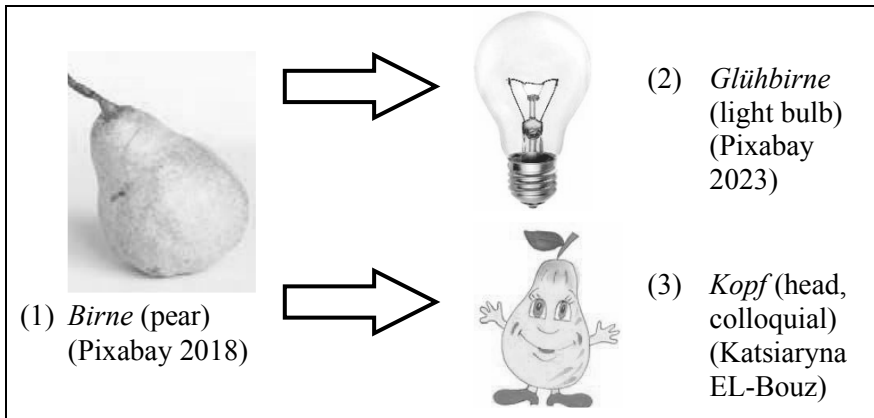
Figure 3.5: Similarity between the fruit 'pear' and other objects which has led to the polysemous nature of the noun in German

There are differences between languages in terms of which denotata are transferred, which is why linguists have asked themselves whether speakers of different languages also perceive different similarities between the objects. This can be visualized using the example of the body part 'Kopf'/'голова' (head) in German and Russian. We will now show which objects the head is compared to in the two languages and which words are consequently used to denote it.

Kopf/голова (head)	
German	Russian
Kürbis (pumpkin)	*дыня* (melon)
Rübe (turnip)	*горшок* (tea pot)
Erbse (pea)	*скворечник* (bird house)
Ballon (balloon)	*чаша* (bowl)

Table 3.1: Metaphorical expressions for the word *head* in German and Russian

As you can see in the images above, speakers associate the body part 'head' with a number of objects. Within both languages, it is primarily the round shape of the head and of other objects that triggers the association. It is interesting to see which of the round objects is ultimately chosen from the vast range of round objects from around the world. It is in this respect that languages differ as the above images clearly illustrate.

Naturally, traditional metaphor theory has also dealt with the question of why there are differences between languages and how they could be explained. One of the answers found, was that there are various world views which are expressed in the respective languages (von Humboldt 1910; cf. Chapter 5).

The differences and similarities are also apparent in the metaphoric use of animal names: In German as in Russian, a cunning person is referred to as a *Fuchs*/*лиса* (fox), a vain person is a *Hahn*/*петух* (peacock) and a contemptible or messy person is called a *Schwein*/*свинья* (pig/hog). Also, Russian uses the noun *петух* (rooster) for an insolent, quarrelsome male person, a transfer of denotations which is not common in other languages. However, it is important to note that speakers of various language communities too attribute different traits to animals. The differences in focus

logically lead to other manifestations of meaning transfers: e.g. even though both Russian and German use the term *Kuh*/*корова* (cow) to denote women, the term is used quite differently. In German *Kuh* describes a woman who has angered the speaker, in Russian, the term *корова* describes a stout, plump woman. The languages create a permanent snapshot of the respective societies' views and how these view the world, it is 'das Auge des Volkes' (the people's eye) (Grimm/Grimm 1854-1960). Meaning transfers reflect a certain interpretation of the contexts and facts of reality (compare Chapter 2 in Volume *Language Learning and Cognition*). But why, then, are speakers of various languages making use of the possibility of the meaning transfer in metaphors at all? Traditional linguistics assumes that language economy is the main reason (Baron 2014). Objects and contexts are constantly emerging and developing: the internet alone has produced a myriad of innovations and new words. New circumstances require new terms to describe and speak about them. If words were constantly invented, our vocabulary would be huge and unwieldy. So instead, one word can denote two or twenty things: the word *Käse* (cheese) in German has two senses, while the word *schneiden* (to cut) has 22 (Dudenredaktion 2017f, 2017g).

The following recent example illustrates how the denotation of a newly emerged phenomenon works. When the communicative necessity arose to find a name for the symbol ✓ ('swoosh'), speakers of the various languages used existing words (image projection, source domain) to name the symbol using a metaphor.

However, there is a phenomenon which contradicts the assumption that language economy is the main reason for metaphoric transfer processes of meaning: a thing has many designations which becomes especially clear when you remember the example on the designation of the body part 'head' (Table 3.1). The use of metaphors in these cases has the goal to express aim, emotion, and attitude of the speaker regarding the context. This is the reason why denotations are accompanied by certain connotations and different styles, for instance coarse, rough, colloquial, derogatory, ironic, and sophisticated. They all serve the purpose of a more vivid depiction of the world.

3.1.1.2 Metonymy as a Transfer of Denotations

There is a second way of making language more vivid: metonymy. It is the transfer of the name of a denotatum to another due to spatial and temporal contiguity. There is a distinct difference between metonymy and metaphor. Metaphors represent a mapping between domains entirely different from one another (cross-domain mapping). For example:

- animal kingdom → objects:

    - *horse* → 1. Gymnastic apparatus, pommel horse
                       2. Chess figure with a horse's head, knight.
    - *cat eye* → safety light

- human body parts → objects:

    - *arm of the lever*
    - *chair leg, table leg*
    - *letter heading* or *nail head.*

In contrast to the metaphor, the mapping of a metonymy takes place in a single domain, in which both denotata are located. The denotata are related to each other. They are in touch in some way, are adjacent to each other or have a temporal relation. In metonymy, one name is used to denote two different denotata. A sub-type of the metonymy is referring to a part of an object with the same name as to the whole, known as pars pro toto. The author of this chapter had to stand in line for long stretches of time to receive consumer goods after the Soviet Union fell apart. These were no long lines you would typically see at the registers of supermarkets. These were a veritable sea of people. If you wanted to be among the first in line and belong to those who received some of the very limited goods, you had to get in line many hours before the store opened. However, it was sometimes necessary to leave your place in line to go to the bathroom or to warm up. If you wanted to find your place in line after returning, you needed to remember the persons who had been standing in front and behind you by remembering distinctive characteristics: *I'm standing behind the red coat, I'm standing behind the blue cap* instead of *I'm standing behind the lady with the red coat, with the blue hat.* Not only is the nature of metonymy evident in this example, but also its pragmatic function: it makes identifying objects easier. Yet other examples of metonymy are *We need some muscle for our team* instead of *we need several physical fit men,* or *I need some clever minds for my project* instead of *I need intelligent people for*

my project. Metonymy highlights a particular – often representative – aspect of the meaning of the word.

Linguists have created systems and classified these transfers (for example, cf. Schippan 2002: 164). For illustrative purposes, some of these types of metonymic transfers are listed here:

- fabric → products made of the specific fabric: *she likes to wear silk* instead of *she likes to wear dresses made of silk*
- container → content bottle: *he drank a whole bottle* instead of *he drank all the beer in the bottle*
- author → his work: *he likes to read Kafka* instead of *he likes to read novels by Kafka*
- place → people at that place: *the whole city is talking about the terrorist attack* instead of *all the people in the city are talking about the terrorist attack*.

Metonomy, just as metaphor, is based on a systematic and regular transfer of meaning. The transfer is often based in the language itself which causes words to be polysemous. These features can be seen in this example involving the word *Birne* (pear): *Birne* (pear) – 1. Frucht des Birnbaumes (fruit of the pear tree), *Die Birnen sind noch nicht reif* (the pears aren't ripe yet), 2. Obstbaum (fruit tree), *Die Birnen blühen schon* (the pears are already in bloom), 3. [als Material verwendetes] Holz des Birnbaums (wood of the pear tree used as building material), *ein Schrank aus afrikanischer Birne* (a cupboard made of African pear). Each of the three denotata, fruit, tree, and wood of the tree, belong to the same domain. They are in direct vicinity to each other, as is the tree and its fruit. They stand in a part-whole relationship to each other or in a temporal relation – the wood of the tree is used after it has been chopped down and processed.

Figure 3.6 illustrates, how the metonymic meanings of the noun *Küche* (kitchen) originate and is proof of metonymy's regularity and productivity.
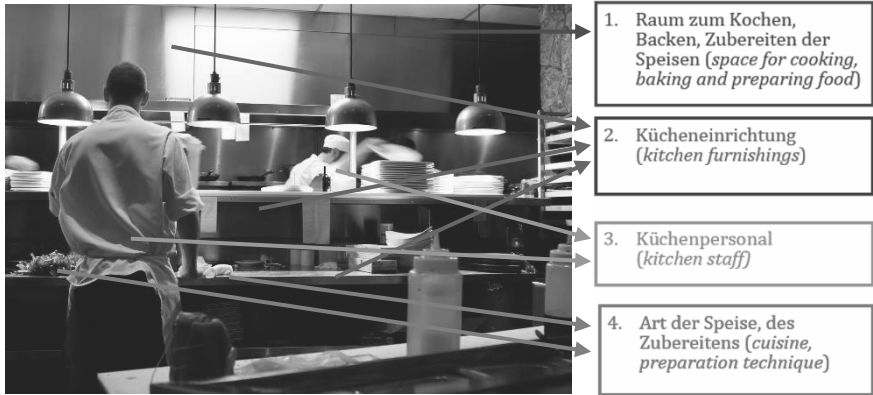
Figure 3.6: Metonymic meanings of the noun *Küche* (kitchen) (Pixabay 2023)

This figure illustrates the nature of metonymy: there are four dimensions, space, furnishings, people/professions, and activities performed in the room which are all referred to with a single word. The base of this reference system is produced by the spatial proximity and direct contact of the four dimensions. The elements can all be found in a single space and stand in contiguous relationships with each other.

This example implies that metonymy, just as metaphor, can serve language economy. However, for a long time, linguistic research was focussed principally on metaphor. Metonymy, to use vivid imagery, was forced to lead a decidedly Cinderella-like existence.

3.1.1.3 Conventionalization of Metaphors and Metonymy

Both metaphor and metonymy display a systemic and regular nature. They penetrate language at all levels and can also be found in academic and technical language, as for example:

- sports*: swallow, bird* – skillful fall to the ground when fighting for the ball with the intention of being awarded a free kick or penalty kick
- politics*: hawk, hawkish, hawk-like behavior*
- medicine*: donor organ, blood image donor*.

The origins of many of these transferred imagery-based meanings have been either lost to us or are no longer transparent for a speaker. Terms have been conventionalized and lexicalized, their meanings stored as a unit in the mental dictionary. Few of us probably know, that the verb *begreifen* (to grasp) is a metaphor in itself, in the sense of *verstehen* (to understand). It originally meant 'leibliches begreifen, berühren, betasten, befühlen' (physically touching, grasping, feeling something). Nor do we think of the fact that the objects displayed below in Figure 3.7-3.12 are all parts of certain objects sharing one and the same denotations, or why that is.

Denotata of the noun *Griff* (handle) in German:	
	Figure 3.7: *Griff* a (handle a) (Katsiaryna EL-Bouz)
	Figure 3.8: *Griff* b (handle b) (Katsiaryna EL-Bouz)
	Figure 3.9: *Griff* c (handle c) (Katsiaryna EL-Bouz)
	Figure 3.10: *Griff* d (handle d) (Katsiaryna EL-Bouz)
	Figure 3.11: *Griff* e (handle e) (Katsiaryna EL-Bouz)
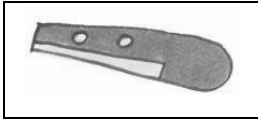
Figure 3.12: *Griff* f (handle f) (Katsiaryna EL-Bouz)

The reason for the multitude of usages is that we do grasp all these objects. Each one comes into contact with the hand, as is shown in Figure 3.13. However, the speakers are often no longer aware of the fact that the multitude of meanings is the result of a meaning transfer.
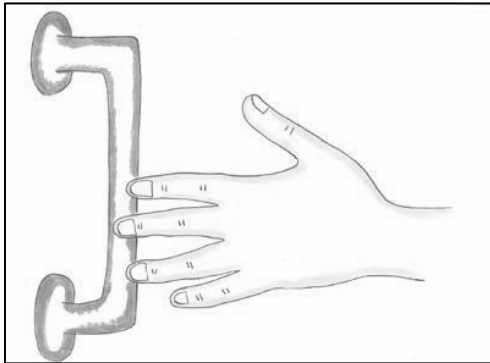
Figure 3.13: The basis of the metonymic denotation of the objects in Figure 3.7-3.12 (Katsiaryna EL-Bouz)

Here again, differences exist between languages. The designation for *Griff* (handle) in Russian stems from *рука* (hand), in particular from its diminutive *ручка* (little hand). Albeit, the mechanism underlying the designation is identical: it is the spatial and temporal simultaneity of the hand touching an object.

While some lexemes lose their imagery when they are conventionalized over time, new, imagery-based expressions are formed all the time. It is not only poets who are productive in this way, it happens all the time in everyday as well as political communication, within many other settings. The imagery of novel expressions, however, is obvious and usually comprehended by readers and listeners without any difficulty. You only need to look at the following press headlines to find examples of newly created imagery-based expressions:

Angela Merkel – die Hochleistungssportlerin (Welt 2013) (Angela Merkel– the high-performance athlete).

Angela Merkel – die Architektin der Europäischen Union (Spiegel 2014) (Angela Merkel – the architect of the European Union).

How is it possible that we are not only capable of producing such imagery-based expressions but are able to comprehend them as well? You will find the answer to this question in Chapter 3.2.

3.1.2   Metaphor as a Mechanism of Conceptualization

The traditional perspective on metaphors we described above is expanded in cognitive linguistics. Metaphors are no longer viewed as merely a stylistic device but as being a cognitive process in itself. It has even been said that the cognitive turn in linguistics began with the study of metaphor and its role in human cognition. Cognitive linguistics no longer confines metaphor to a linguistic level but instead views it as an expression of cognitive activity. Language in general is no longer viewed as an autonomous and isolated module independent from other cognitive abilities but as an expression of human cognition itself. Researchers assume the existence of a close interaction of "language – mind – culture" (Gibbs 2008: 5) (compare Chapters 1.1 and 5.1, also compare the cognitive commitment in Volume *Language Learning and Cognition*).

Cognitive linguistics asks many questions such as 'What can we assume about human cognition in general through language?' and 'What does language tell us about cognition?' The study of metaphors can illustrate the connection between language and cognition, therefore, research on that subject is deemed very important in the field of cognitive linguistics. But it necessitates shifting the research interest from the question of how we understand transferred utterances towards the question of how they come into existence in the first place.

3.1.2.1   The Conceptual Metaphor According to Lakoff and Johnson

A new understanding of metaphors emerged in cognitive linguistics, even though some researchers like Weinrich (1963) had published on the same subject much earlier. In the 1980s, Lakoff & Johnson developed a cognitive theory of metaphors which identified metaphors as an essential part of

everyday language and as an integral component of human thought processes (Lakoff/Johnson 2011: 14). According to their theory, perception, thought, and, consequently, actions are influenced and determined by conceptual metaphors. Based on their understanding of metaphors, the daily perception and actions of humans are structured by a conceptual, metaphoric system:

> We have found […] that metaphor is pervasive in everyday life, not just in language but in thought and action. […] Our concepts structure what we perceive, how we get around in the world, and how we relate to other people. Our conceptual system thus plays a central role in defining our everyday realities. If we are right in suggesting that our conceptual system is largely metaphorical, then the way we think, what we experience, and what we do every day is very much a matter of metaphor. (Lakoff/Johnson 1980: 3)

As a result, the focus was no longer on individual transfers of meaning from one denotatum to another based on similarities. What matters is conceptualizing the very idea of something abstract and inanimate in terms of something concrete and animate. This is the reason why fundamental thought processes and the mechanism of conceptualization of certain perceptions and subject matters are considered central.

Our experiences with our own body and our immediate environment play the most important role in these processes. They provide us with source domains, conceptual images which we can project onto the abstract fields of the target domains. It is thanks to the source domains that we can envision the target domains at all. This way, mental and psychological processes such as *deep, pure, great, bright joy* or *to spoil someone's joy,* can be presented in terms of concrete objects or contexts. The examples in the preceding sentence show how the emotion *happiness* is sometimes conceived as an object (*large*), sometimes as a fabric-like material (*pure*/*clean*), sometimes as a dish (*oversalted*/*spoiled*) and so on. The metaphor is the means of being able to imagine something tangible, graphic, and to be able to talk about it. The images and ideas of concrete objects and activities stored in our brain are the basis for the process of conceptualizing the abstract or the new. An example is how the bodily experience

of *sich* [*ins eigene Fleisch*] *schneiden* (to cut oneself, to injure oneself with a sharp object) was used to conceptualize a mental condition in German ('to hurt one's own chances'). Eventually, it was attributed the meaning *to err, to miscalculate* and even later, received the more abstract meaning of *to be mistaken* (see Chapter 1.3 in this volume).

3.1.2.2 Different Languages – Different Metaphors?

The aforementioned close interaction of language, mind, and culture is clearly represented in metaphorization. For speakers of two different languages, it is frequently the case that, despite having a common set of practical experiences, certain experience-based structures for the metaphoric conceptualization of abstract fields are used in merely one language, but not necessarily in the other. The example of the German metaphor *sich [ins eigene Fleisch] schneiden* is not interpreted in this way in Russian. New idioms such as *der Drops ist gelutscht* (Steffens/Nikitina 2014, Steffens/al-Wadi 2015) (literally: the drop has been sucked) in the sense of 'a decision has been made, something has irrevocably taken place, game over' or *etwas in die Tonne treten* (literally: to chuck something into the dustbin) in the sense of 'to give up on something, to ruin something, to eschew something*'* are very illustrative in this respect. However, such idioms are not necessarily used for any further metaphoric conceptualizing. On the other hand, practical experience structures can differ in two linguistic and cultural communities despite being used for an identical metaphoric concept. An example is the idiom *to tear down all bridges behind oneself* which means to break off all contact. Russian speakers metaphorically burn down their bridges.

Chapter 3.2 will discuss the workings of different practical experiences which result in identical metaphoric concepts and the important roles of metaphor and metonymy in cognitive mechanisms.

3.1.3 Summary

- The most important types of imagery-based language are metaphor and metonymy.
- The cognitive linguistic view of metaphors is different from traditional linguistics and literary studies.

- Traditional linguistics views metaphor as a linguistic phenomenon: a transfer of denotations from one denotatum to another is due to natural similarity. Despite that, languages differ in what denotata they deem similar.
- Traditional linguistics views metonymy as a transfer of denotations from one denotatum to another based on contiguity.
- Metaphor and metonymy have the effect that the range of meanings of the transferred words is expanded. It makes them polysemous.
- All the important functions of metaphor and metonymy were formerly attributed to a necessity of finding new designations for new denotata.
- Metaphor and metonymy are systemic and regular linguistic phenomena. Many are no longer perceived as imagery-based or transferred denotations. They are lexicalized and conventionalized.
- Cognitive linguistics' understanding of metaphor has changed. Metaphor is now viewed as a cognitive mechanism of conceptualization, a result of cross-domain mappings. Physical (embodied) experiences and structures based on experiences serve as source domains for the conceptualization of abstract target domains.
- The culture of the language community plays an important role. It can lead to differences between the languages in terms of the semantic structures of polysemous words and idiomatic expressions.
- Not only linguistic knowledge is necessary to understand metaphors: encyclopaedic knowledge (culture, history, traditions) is also required.

3.1.4 Review Questions

1. How has the understanding of imagery-based language changed over time?
2. Explain how the metaphoric transfer of denotations takes place. Use examples to illustrate the processes.
3. How can the differences of metaphoric meanings between languages be explained? Illustrate using examples.

4. Explain how the metonymic transfer of denotations takes place. Illustrate using examples.

5. Explain how the understanding of the metaphor as a cognitive mechanism of conceptualization differs from the understanding of the metaphor as a purely linguistic phenomenon.

6. How do you explain the differences in metaphoric conceptualizing between various languages?

3.2 Mental Imagery in Cognition: Conceptual Metaphor, Embodiment, and Prototype Semantics

Katsiaryna EL-Bouz

In the previous chapter, we introduced the most important types of figurative speech. You have learned about the difference between a metaphor in the traditional sense and the conceptual metaphor, a concept of cognitive linguistics. In this chapter, we want to pursue the answers to the following questions: What makes abstract concepts tangible? What is the significance of our body for cognitive processes? How do we mentally organize the world around us? To answer these questions, we need to discuss aspects of the conceptual metaphor in greater detail. You will explore how conceptual mapping works and in what ways it is connected to bodily experiences. Afterwards, we turn to the phenomenon of embodiment and study how deeply our bodies are intertwined with cognition. We will then discuss which principles are active when we create categories structure our environment with language.

Study Goals

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

- explain how conceptual mapping works
- understand and explain the connection between bodily experience and cognition
- present the most important principles underlying the formation of categories.

3.2.1 Structure and Traits of Conceptual Metaphors

As you have already learned in Chapter 3.1, the conceptual metaphor is a fundamental cognitive mechanism with which we can conceptualize the abstract and put it into words. This mechanism is rooted in our non-metaphoric understanding of the world as well as in our bodily experiences.

The conceptual metaphor conceives an abstract entity (target domain) using the words of a concrete, experienceable entity (source domain); this

process of transferring traits is called conceptual mapping. In conceptual mapping, image schemas of concrete sensorimotor fields of experience are projected through imaginative processes onto abstract areas of experience and are then used to understand, structure, and verbalize these abstract areas (for greater detail, see Chapter 1.2 in this volume and Chapter 2.1 in Volume *Language Learning and Cognition*).

> Image schemata are elaborate conceptual configurations that result from the basic cognitive domains. These are dynamic, recurring and universal patterns of our sensorimotor experience or our interaction with the environment. Image schemata help to generate the meaning of these experiences and interactions and help us to think about them logically. Thus, image schemata help to solve various adaptation problems in complex physical environments: They make it possible to unify and structure many individual perceptual experiences and to structure them in a coherent way. Therefore, image schemata are an inherent base for us functioning successfully in the world (Gibbs 2005: 69, Johnson 1987: 29, Johnson 2005: 18, Langacker 2008b: 33, Radden 1994: 75). (Translated from Kanaplianik (EL-Bouz) 2016: 33–34)

The reason behind our need for metaphoric projection of image schemas is the fact that the abstract domains are not directly accessible to our sensory perception. They are vague and difficult to grasp. By referring to concrete, non-metaphoric fields of experience (image schemas), it is possible for the person doing the conceptualizing to imbue abstract terms with a comprehensible, internal structure. A speaker can associate these abstract terms with everyday experiences, making them easier to process by creating a concept that is equipped with an explanatory function (Beißner 2002: 63, Bellavia 2007: 16, Gibbs 2005: 74, Kövecses 2002: 6, Lakoff/Johnson 1980: 112, Lakoff/Johnson 1999: 171, Lakoff 2006, Lakoff/Turner 1989: 59, Lampert/Lampert 2000: 250, Meex/Mortelmans 2002: 53). We can often observe that participants in a TV debate tend to use war terms such as *to jeopardize a discussion*, *to defend one's arguments*, *to go onto the defensive/offensive*. This is a manifestation of the conceptual metaphor ARGUMENT IS WAR (Lakoff/Johnson 2003: 5): to make the abstract concept 'discussion' or 'argument' more tangible we refer to a tangible ex-

perience – warfare. We transfer the characteristics of a battle (the participants are in opposition to each other, defend their positions, and attack other positions) onto a debate/an argument. The abstract concept of 'debate' thereby receives an internal structure and an appropriate distribution of roles.

Conceptual mappings are asymmetrical and unidirectional: the projection of the traits is oriented from the source domain towards the target domain because the source domain has a stronger tie to the physical experiences (Lakoff 2006: 232–233, Roche 2012: 35) (for more detail, see Chapter 2.1 in Volume *Language Learning and Cognition*).

Mapping also only occurs partially and not arbitrarily: not all characteristics of the source domain are necessarily transferred to the target domain. Only those parts of the image-schematic structure that are compatible with the target domain are transferred (Lakoff 2006: 232–233; compare Kövecses 2000a, Pelyvás 2000, Turner 1993). An important restriction of conceptual mapping is that the image-schematic structure of the target domain cannot be infringed in this process (Turner 1993: 291–292). We would not, for example, find the concept of a 'fire trench' in the description of a debate even though trenches are a common element of warfare. Perhaps the reason for that is that the concept of 'trenches' has no equivalent in the typical procedure of discussions in which all participants are clearly visible.

Another very graphic example of conceptual mapping is the metaphor TIME IS MONEY (Lakoff/Johnson 1980, 2003). The metaphor exemplifies how we conceptualize and verbalize the target domain (TIME) in the terms of the source domain (MONEY), and also how we act accordingly. Time is seen as a precious resource, as something that can be owned and represents a limited resource; this is why we experience time as something that can be spent, used, calculated, invested wisely or badly, saved, wasted (Lakoff/Johnson 2011: 16). According to the classification of Lakoff and Johnson, the metaphor TIME IS MONEY is a structural metaphor. A structural metaphor is created when an abstract concept is structured by a concrete concept. Despite that, some traits of the target domain are highlighted while others are hidden ("highlighting and hiding", Lakoff/Johnson 2003). Lakoff & Johnson differentiate between two additional types of conceptual metaphors: **orientational metaphors** and **ontological metaphors**. In the case of orientational metaphors a whole system of concepts is organized. It usually follows the principles of bodily orientation in space (for example

HAPPY IS UP, SAD IS DOWN: *I feel elated today, I feel beaten*). An ontological metaphor represents the conceptualization of an abstract concept as an entity or matter. Also, the object of the abstract concept is made physically quantifiable (for example INFLATION IS AN ENTITY from which statements such as *inflation is growing* can be derived (Lakoff/Johnson 1980, 2003, 2011; cf. Weininger 2013: 23–24). You can find more on the classification of conceptual metaphors in Chapter 2.1 in Volume *Language Learning and Cognition*.

Often, a concept cannot be grasped by a single conceptual metaphor but instead by a whole metaphoric complex. In such cases, a system of metaphorical concepts is formed with elements related to each other in a coherent fashion (Brünner 1987: 100). An example is the **conduit metaphor** (Reddy 1979), a system in which the human, in the role of the speaker or the listener, is conceptualized as a superordinate, large container. Examples are: *I am full of ideas/full of joy/full of sorrow*. Verbal expressions are containers for objects, for thoughts and ideas, seen in phrases such as *empty talk, empty chatter* (word container without content or meaning). Communication is conceptualized as sending such containers (cf. Brünner 1987), for instance: *communication barrier*.

> According to the CONDUIT metaphor, the performance of a speaker consists of selecting suitable word containers into which he packs thought objects from his mind container in order to send them to the listener, e.g. via a tube. The listener opens the word cases sent to him, takes the objective content and puts it into his own mental container so that he can absorb and understand the speaker's thoughts 1:1. (Translated from Drewer 2003: 128)

Metaphorical attribution varies in its universality. Some metaphors are universal, others are quite wide-spread, and some are specific to a culture and language (Lakoff 2006: 232–233). All three types of metaphorical attribution are, however, tightly interwoven. The example quoted above, TIME IS MONEY, is considered widely as being characteristic of Western societies. Another example is love, which has been conceptualized in English, in German, and in other languages as a journey, fire, war, as madness, magic, physical power or patient. Here are several examples:

love is… (*Liebe ist …*)	English (Source: Lakoff/ Johnson 2003: 49; cf. Lakoff 1993)	German (Source: Lakoff/ Johnson 2011: 62–63, Strietz/Kopchuk 2009: 84)
a journey (*eine Reise*)	- *Look how far we've come.* - *It's been a long, bumpy road.* - *We can't turn back now.* - *We're at a crossroads. We may have to go our separate ways.* - *The relationship isn't going anywhere.* - *We're spinning our wheels.* - *Our relationship is off the track.* - *The marriage is on the rocks.* - *We may have to bail out of this relationship.*	
physical power (*physische Kraft*)	- *I could feel the electricity between us.* - *There were sparks.* - *I was magnetically drawn to her.* - *They are uncontrollably attracted to each other.*	- *Ich konnte die elektrischen Schwingungen zwischen uns fühlen.* - *Zwischen den beiden hat es gefunkt.* - *Sie zog mich an wie ein Magnet.* - *Sie fühlen sich sehr stark zueinander hingezogen.*

madness (*Wahnsinn*)	- *I'm crazy about her.* - *He constantly raves about her.* - *He's gone mad over her.* - *I'm insane about her.*	- *Sie gefällt mir wahnsinnig.* - *Er kommt ständig ins Phantasieren, wenn er von ihr redet.* - *Er ist völlig verrückt nach ihr.*
magic (*Magie*)	- *She cast her spell over me.* - *The magic is gone.* - *I was spellbound.* - *She had me hypnotized.*	- *Sie verfluchte mich.* - *Der Zauber unserer Beziehung ist verflogen.* - *Ich war wie gebannt.* - *Sie hat mich hypnotisiert.*
war (*Krieg*)	- *He is known for his many rapid conquests.* - *She fought for him, but his mistress ironed out.* - *He won her hand in marriage.* - *He overpowered her.* - *He made an ally of her mother.* - *Theirs is a misalliance if I've ever seen one.*	- *Er ist bekannt für seine unzähligen Eroberungen.* - *Sie kämpfte um ihn, aber seine Geliebte hat den Sieg davongetragen.* - *Er gewann sie durch die Ehe.* - *Sie war von ihm überwältigt.* - *Er machte ihre Mutter zur Verbündeten.* - *Ihre Beziehung ist eine Misallianz, wie ich sie noch nie gesehen habe.*

a patient (*ein Patient*)	- *This is a sick relationship.* - *They have a strong, healthy marriage.* - *The marriage is dead – it can't be revived.* - *We're getting back on our feet.*	- *Ihre Beziehung krankt an etwas.* - *Sie führen eine starke und gesunde Ehe.* - *Ihre Ehe ist tot – sie kann nicht wieder zum Leben erweckt werden.* - *Wir kommen schon wieder auf die Beine.*
fire (*Feuer*)	*"I'm burning in my longing for you."* *"This is my latest flame."* *"Tender love flared."*	- *Ich verbrenne vor Sehnsucht nach dir.* - *Das ist seine neueste Flamme.* - *Zärtliche Liebe flackerte auf.*

Table 3.2: Conceptual metaphors on the subject of 'love' in English and German

The Volume Language Learning and Cognition elaborates further on the cultural specifics of conceptual metaphors and their role in foreign language teaching in the Chapters 8.2 and 2.1.7.

The conceptual metaphor is a key part of our thinking and brings to light that our conceptualization process is imagery-based as well as revealing the crucial role of imagination in thinking (Bellavia 2007: 25–26, Littlemore 2009: 97, Littlemore/Low 2006: 13). The conceptual system by which we think and act is metaphorical at its core (Lakoff/Johnson 2003: 3). From this vantage point, Gibbs and other researchers view metaphorical language as a reflection of human mentality and culture:

> Metaphor is not merely an instance of language, a special rhetorical device used for communication and persuasion. Instead metaphor is a fundamental mental capacity by which people understand themselves and the world through the conceptual mapping of knowledge from one domain onto another. The overwhelming ubiquity of metaphor in language, thought, science, law, art, myth, and culture illustrates that metaphor is an integral part of human life. (Gibbs 1994: 207)

As we have seen in numerous examples in this section the sources of metaphoric mappings usually originate from bodily activity, perception, and parts of our everyday experiences such as holding, touching, eating, giving, body parts, animals and plants, colors, and so forth (Kövecses 2002: 25, Radden 1994: 79, Weininger 2013: 23). The fact that metaphoric mappings are rooted in concrete experiences that relate to bodily activity highlights how our thinking is imprinted by embodiment. A fact which we will cover in detail in the next section.

3.2.2 Embodiment

Our skin is soft and full of nerve endings, so we can feel changes in temperature. This ability is the reason for the existence of words such as *hot*, *warm,* and *cold* in our vocabulary. Now, imagine a creature with a skin of stone which feels no difference between -30 degrees and +40 degrees. Concepts such as 'hot' and 'cold' would probably not exist in this creature's way of thinking. This example illustrates the profound role our body plays in thinking and language leading us directly to the theory of embodiment.

The term 'embodiment' refers to the interaction between brain, body, and physical environment (Gibbs 2005: 66–67). The core of the embodiment theory is formed by the assumption that our conceptual structures emerge from sensorimotor experiences and their underlying neural structures. Consequently, conceptual structures are intrinsically motivated by their connection to the body and to physical experiences (Lakoff/Johnson 1999: 77–78; also see Chapter 1.3 in this volume). The views of the embodiment theory help to expand and deepen our understanding of the conceptual metaphor.

According to the embodiment approach, multimodal representations emerge through our physical interactions with our environment. These physical interactions are the basis of the concepts we formulate. Multimodal representations represent the reactivation of brain conditions recorded during these interactions. They include sensorimotor and proprioceptive experiences, as well as conditions that originate from the subjective experience of our internal (bodily) environment or sense of time (cf. Bellavia 2007, Evans 2012, Holme 2009). Hence, our experiences are structured by the shape and the movement of our body:

The representation of what we call 'three-dimensional space' is thus constructed in the brain on the basis of our biological configuration and our interaction with the environment. Everything we know about external reality comes to our awareness through the activity of the body. (Translated from Bellavia 2007: 238)

More examples that illustrate the phenomena of embodiment include the concepts of colors and orientation in space. Our perception of colors arises from the interactions between our visual organ, our brain, the reflective properties of the objects, and their electromagnetic radiation. On the basis of these, our concept of color develops. Many animal species (like cats, dogs, and bats) see colors differently from humans because their visual organs are built differently. The terms *front* and *back* (for example of a car) are based on the projection of the human body which also has a front and back. If our bodies were built differently (for example being the same from all sides) we would probably not be capable of differentiating between *front* and *back* (cf. Lakoff/Johnson 1999, Evans 2012).

In summary, we can say that bodily experiences serve as a foundation for the perception, conceptualization, and verbalization of our environment and ourselves. Our bodily experiences (in particular) predetermine the processes (compare Chapter 1.3 of this volume for an account of several empirical studies on the phenomena of embodiment). Reality is, therefore, not objectively accessible to us. Instead, it is a function specific to us as humans and our individual embodiment (cf. Lakoff/Johnson 1999, Evans 2012). Consequently, we can say that all cognition can be called embodied. Cognition cannot be separated from the body and is dictated by the structure of our bodies (as does the design of our brain or our sensory organs) (Bellavia 2007: 238, Holme 2009: 36; compare Evans 2012). Radden describes the phenomena as follows:

We would experience the world differently and interact with it differently if we had a different body: if we were three millimetres tall or crawling on all fours, had the nose of a dog or the sonar system of a bat. The type and nature of our perceptions and experiences is not only limited by our body but also motivated by it. (Translated from Radden 1994: 75)

Language and cognition are inseparable (more in Volume *Language Learning and Cognition*), and so embodiment proves itself as an essential basis of language (Gibbs 2005: 88). We will discuss the combined effects of embodiment and conceptual metaphorization in the following section (see also Suñer/Roche 2021 on a taxonomy of embodiment in language learning and its application to grammar animations).

3.2.3   Conceptual Metaphorization and Embodiment

In the first section of this chapter, we discussed how humans use their phenomenal (concrete) bodily experiences systematically for structuring abstract knowledge domains. In this sense, embodiment also underlies the process of conceptual metaphorization. We have already discussed aspects of the connection between embodiment and conceptual metaphorization in the first section, so, in what follows we will take a closer look at the phenomena of the **primary metaphor**.

Several authors emphasizing the importance of conceptual metaphor for our cognition (Narayanan 1997, Lakoff/Johnson 1999) did claim that the base level of metaphoric allocation is not the conceptual metaphor but the primary metaphor. The latter also emerges from our bodily interactions with our environment but it is more fundamental in principle (Grady 1997, Grady/Johnson 2003). Lakoff & Johnson have examined the primary metaphor from a conceptual perspective as well as from a neuronal one. Primary metaphors follow the same principles the conceptual metaphor adheres to (Lakoff/Johnson 1980, 1999, 2003). The mapping of primary metaphors, however, has a more profound neuronal basis according to Lakoff & Johnson:

> Primary metaphors, from a neural perspective, are neural connections learned by coactivation. They extend across parts of the brain between areas dedicated to sensorimotor experience and areas dedicated to subjective experience. The greater inferential complexity of the sensory and motor domains gives the metaphors an asymmetric character, with inferences flowing in one direction only. (Lakoff/Johnson 1999: 57–58)

Primary metaphors are, therefore, not the result of a conscious, multistage interpretation process, but the result of immediate conceptual mappings via neuronal connections (Lakoff/Johnson 1999: 57–58). Basic concepts such as CHANGE IS MOVEMENT, HELP IS SUPPORT and CAUSES ARE PHYSICAL SOURCES all belong to the category of primary metaphors. They all possess minimal structure and develop naturally, automatically, and unconsciously. Primary metaphors emerge when our everyday experiences blend with cross-domain associations and are grounded in the neuronal connections of our brain (Narayanan 1997). For their part, primary metaphors are the foundation of complex metaphors. Complex metaphors result from conceptual blendings in an especially diverse mental space, as the fusion of the characteristics of both source and target domains (cf. Lakoff/Johnson 1999: 46–47, Littlemore 2009: 100, Fauconnier/Turner 1995, 1998, 2008; for a more detailed account of conceptual blending, see Chapter 2.1 in Volume *Language Learning and Cognition*). We automatically and unconsciously acquire a huge system of primary metaphors when we interact in simple everyday life as children; this is the time when the neuronal connections for metaphoric allocations are formed. The end result is that our thought processes are naturally and unconsciously based on hundreds of primary metaphors (Lakoff/Johnson 1999: 47, 57):

> We have a system of primary metaphors simply because we have the bodies and brains we have and because we live in the world we live in, where intimacy does tend to correlate significantly with proximity, affection with warmth, and achieving purposes with reaching destinations. (Lakoff/Johnson 1999: 59)

Primary metaphor theory has many parallels in the theory of the conceptual metaphor as a whole. However, primary metaphor theory emphasizes the role of embodiment for cognition more stringently by emphasizing that the basis for metaphoric allocations can be found in the co-activation of neuronal connections. According to this theory, the conceptual metaphor is a phenomenon that appears gradually in later stages as a result of the processes of conceptual blending and differentiation (Lakoff/Johnson 1999: 49). It is, nevertheless, still unclear whether the conceptual (or primary) metaphor can actually be related to neuronal connections (cf. Hutchinson/ Louwerse 2013, Ortíz 2011).

We have learned that humans create their own subjective images of the world based on their cognitive abilities and their physical disposition. In this process, we as humans tend to give structure to the images in order to organize them. This is achieved through the process of categorization among others. We will learn how categorization works in the next section.

3.2.4 Prototype Semantics

Categorization and categorization processes help us to create meaning by partitioning our environment into points of reference. These points of reference are connected with each other through categories as well as the horizontal and vertical meaning relations in between them.

We speak of categories when we conceptualize two or more entities as one and attribute the same designation to different contexts and circumstances. Every word, with the exception of proper names, can designate more than one object and potentially represents a whole category. The word *bird* refers to a category, as does the word *sparrow,* as there are innumerable sparrows in the world. In all, the category SPARROW is subordinate to the category BIRD. Dividing contexts into categories is called categorization as we will see in the next section (compare Chapter 1.3 in this volume).

The classic theory of categorization dates back to Aristotle and is based on the following principles:

- A category is defined as being composed of necessary, sufficient characteristics.
- These characteristics are binary. They either exist or they do not.
- Categories have clear boundaries. Either an element belongs in a category or it does not.
- All members of a category have the same status (Cletiu 1997, Taylor 1989).

Experiment

Name a (random) bird, animal, flower, berry, fruit, or vegetable. Ask your acquaintances or fellow students to do the same and compare the results. Do you notice anything unusual about the answers?

After this little experiment, you have probably noticed that the many answers still have a lot in common: for example, *sparrow, eagle,* or *pigeon* as typical BIRDS, *apple, banana, orange* as FRUIT, *potatoes, tomato,* or *cabbage* as VEGETABLE, *strawberry* or *raspberry* as BERRY. Did any of the participants name *penguin* or *melon*? If they did, they belong to an especially creative type of person. However, we suspect that *penguin* and *melon* were probably not named at all, even though they doubtlessly belong biologically to the categories mentioned above. How can this phenomenon be explained?

The psychologist Eleanor Rosch (Rosch 1973, 1975) proposed a different perspective on categorization. She established a new theory in her research based on the concept of the prototype. According to this theory representatives of a category do not have the same status. Some members represent a category better than others.

The prototype is the ideal representative of a category, the one most people associate with a specific category. The internal structure of many categories is, therefore, organized hierarchically: the prototype – or several prototypes – are positioned at the core of the category. The remaining members are sorted from best (close to the centre) to worst (farther away). This structure is illustrated in Figure 3.14.
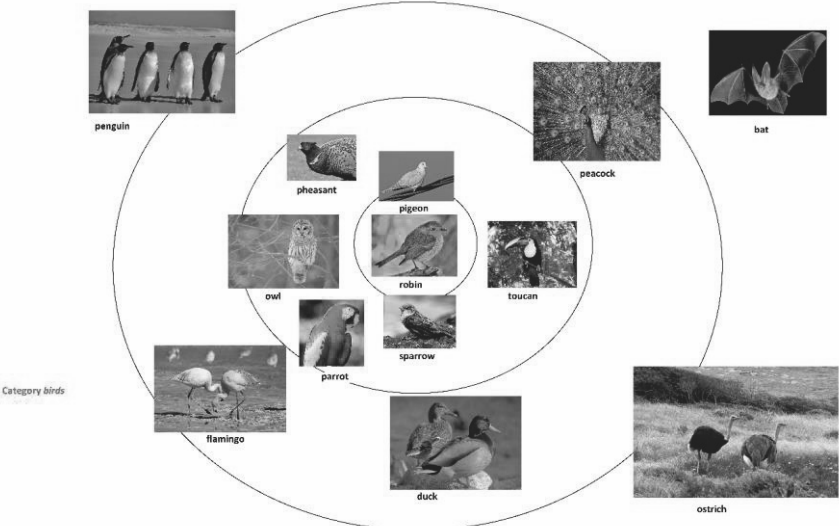
Figure 3.14: The category BIRD (Wildgen o.J.)

Several experiments and tests on the subject of categorization lead to the following conclusions (Kleiber 1993):

- Prototypical representatives of a category are recognized faster than others.
- Children learn the prototypical representatives first.
- Prototypes serve as cognitive reference points for further thought processes.
- Prototypes are the first to be listed if a person is asked to name representatives of a category.

If categories are organized around prototypes the boundary of a category is no longer clear-cut, but vague. A single entity can be a member of more than one category. Categories can blend into each other. The question of an element's membership cannot always be resolved by saying that 'yes, it belongs into this category', or 'no, it does not' (Lakoff 1973, Kortmann 1999). This context is illustrated in the following example revolving around the category BIRD.

Experiment

Sort the following statements (Lakoff 1973) from 1 to 5, 1 being true, and 5 being absolutely false. What guides you in your decisions?

The chick is a bird.

The cow is a bird.

The sparrow is a bird.

The penguin is a bird.

The bat is a bird.

Most of the statements cannot be identified as definitely true of false. Instead, they can be sorted into a kind of five-point-scale:

(1) The sparrow is a bird. (true)

(2) The chick is a bird. (less true than 1)

(3) The penguin is a bird. (less true than 2)

(4) The bat is a bird. (false or very far from the truth)

(5) The cow is a bird. (absolutely false)

<div align="right">(Lakoff 1973)</div>

Bats possess the trait 'ability to fly' moving them towards the category BIRD and thereby creating categorical vagueness. On the other hand, there are penguins: they are birds, biologically, but lack important traits of the category BIRD such as the 'presence of clearly visible feathers' and the 'ability to fly'. The lack of such trails estranges the penguin from the image of a typical bird. This makes it difficult to define borders for categories; instead, it is easier to identify the areas in which a category blends into another (Lakoff 1973).

Categorization gives us two possibilities of naming a certain context (for instance 'X'). The first of the two possibilities is to answer the question 'Why is X a dog and not a cat or a bike?'. If we want to answer this question, we must exclude all terms which cannot designate X. Additionally, we list all traits of X which are characteristic of the category DOG and not for the categories CAT and BICYCLE and vice-versa. During this process, we operate on the **horizontal dimension of categorization**, the main traits of which have been discussed above.

The second possibility is to answer the question 'Why is X a dog and not an animal or a mammal?'. Here, we need to choose which categories X actually belongs to. We need to identify superordinate and subordinate categories in our answer and define which concept pools the most information and appears most frequently in communication (cf. Kortmann 1999). This is called the **vertical dimension of categorization**. It will be explained in the following section.

The starting point of categorization in the vertical dimension is the observation that a single object can simultaneously belong to several categories. The dog on the lawn outside is not only a DOG, it is also a BOXER, a MAMMAL and a LIVING BEING. But these are not merely synonyms of this particular dog; the four categories belong to different levels. In relation to *dog*, both *living being* and *mammal* belong to superordinate categories while *Boxer* belongs to a subordinate category. The categories form a hierarchy following the principle of an exclusive relationship (Kleiber 1993). For example: *All sparrows are birds, all birds are living beings.*

Rosch (1975) proposes partitioning the vertical dimension of categorization as follows:

- The superordinate level: ANIMAL, FURNITURE
- The basic level: BIRD, CHAIR
- The subordinate level: EAGLE, ROCKING CHAIR.

Categories of different levels are not equal when it comes to their use in communication: if you were to ask someone who or what he or she sees on the lawn he or she would likely answer 'a dog' instead of: 'a living being', 'a mammal' or 'a boxer'. We typically use the category of the basic level in everyday communication. There are several reasons for this tendency (Kleiber 1993, Kortmann 1999, Lakoff 1987):

(1) Representatives of the basic level have several common traits and are, thus, perceived as similar. As a consequence, we do not, for instance, have a mental image that corresponds to *animal* but do have one for *dog* or *boxer*. Similarly, we could easily draw a dog or a Dachshund, but not an animal. It follows that the basic level is the highest abstract level whose representatives trigger an image of a common, global shape. The global shape is perceived as a whole and can be illustrated with a picture or a diagram.

(2) Humans are equipped with an action schema or a motor program for the interaction with representatives of certain classes of the basic level. If we see a chair or a rocking chair, we know what we have to do: sit on it, and, in the case of a rocking chair, rock. We do not, however, have a consistent action plan for the superordinate category FURNITURE. The concept of FURNITURE is simply too broad and too abstract. We can only assume that we can sit on it or store something in or on it. But these assumptions comply with certain mental images of base level categories such as CHAIR, TABLE.

(3) Base level categories are identified faster. If you show someone a picture of a bullfinch, the person will probably identify the creature as a bird before he or she identifies it as a bullfinch or a living being.

(4) Base level categories are stylistically neutral in general. This is expressed by categories containing shorter words with fewer syllables (ANIMAL, TABLE); the subordinate categories often harbor more complex words and terms (CHILEAN BOXER, KITCHEN TABLE). Their complexity expresses their specificity.

(5) During language acquisition and language learning children are fast at learning terms of the basic level. Rosch conducted experiments with three-year old children and discovered that, while the children retained the basic categories easily, they had difficulties with the superordinate and subordinate categories (Rosch 1978, Rosch/Mervis 1975, Rosch/Mervis/Gray/Johnson/Boyes-Braem 1976).

3.2.5 Summary

- The conceptual metaphor is a fundamental cognitive mechanism which we use to structure abstract concepts utilizing concrete experiences. The process behind the cognitive mechanism is called conceptual mapping. It entails transferring the traits of a concrete entity (source domain) onto an abstract entity (target domain). The phenomenon of the conceptual metaphor reveals how concept formation is imagery-based and imagination is essential in our thinking.

- The perception, conceptualization, and verbalization of our environment can be ascribed to our bodily experiences and the shape and build of our body. We can, therefore, say that our cognition is embodied. Our view of reality is not an objective given but is, in fact, a function of embodiment specific and individual to us as humans.

- According to prototype semantics categories possess a hierarchical internal structure. In this structure the most prototypical representatives are close to the center of the category while the least prototypical representatives are located in the peripheral areas of the categories. By these means, the affiliation with a category can be gauged in degrees.

- The base level categories possess the greatest saliency (in the vertical dimension of categorization): people perceive and store them as a similar, simple mental image. Base categories are identified more easily on the basis of that simple mental image.

3.2.6   Review Questions

1.   Explain how conceptual mapping works.

2.   How is cognition interconnected with the body?

3.   Explain the difference between conceptual metaphor theory and primary metaphor theory.

4.   How are the categories organized according to prototype semantics?

3.3 Mental Imagery in Knowledge Acquisition: Mental Models

Katsiaryna EL-Bouz

We have seen in Chapters 3.1 and 3.2 that our thought processes and our language are inseparably entwined with the phenomena of mental imagery. In this chapter, we will learn about the role of mental imagery in the processes of knowledge acquisition. We will show how knowledge, including knowledge on language, is dynamically constructed from the new experiences and is integrated into the existing knowledge base. Knowledge can also be constructed on the basis of a person's thought processes which in turn are based on already existing knowledge structures (Seel 1991: 10, Seel 2003: 250). You will learn how new knowledge is linked with already established knowledge and how new knowledge is represented in the shape of imagery-based mental models. You will also learn in this chapter how the formation of mental models aids the learning process and how a learner's mental models can develop.

Study Goals

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

- – explain processes of knowledge acquisition
- – understand the role of mental imagery in the construction of new knowledge
- – understand the learning processes of students and support them in class.

3.3.1 The Formation of Mental Models

Each day, everyone of us is confronted with new information which needs to be integrated into already existing knowledge structures. People also encounter new problems demanding proper solutions. The result of the integration and problem-solving processes ideally should be a balanced cognitive system (**equilibrium**; Piaget 1975). Such an equilibrium can be attained in two different but complementary ways: either through assimi-

lation (top-down processing) or accommodation (bottom-up processing) (Piaget 1975; also see Chapter 6.1 in Volume *Language Learning and Cognition*). The prior knowledge of an individual is central to both processes. If the new knowledge can be interpreted on the basis of previous experiences and no conceptual changes are necessary, the new knowledge can be integrated into a person's existing knowledge structures seamlessly. If the individual has access to a functioning schema for the problem at hand the schema is used. The process of **assimilation** takes place in both scenarios.

But what happens if the individual is not able to reconcile the new knowledge with his existing knowledge structures, and if he is not able to apply an existing schema to the problem? In such cases, the knowledge structures must be changed, restructured, and expanded in relation to the new information. This process is called **accommodation**. Two variants of the process of accommodation are possible depending on the targeted result.

The first variant is either **accretion** which expands on an already existing schema, or **tuning**, which merely adjusts the schema. If these processes bear no fruition, there is another possible variant. It generates a subjective mental model in the working memory through reorganizational processes (Hanke 2006: 10, Ifenthaler 2010: 82, Kanaplianik (EL-Bouz) 2016: 105–106, Roche 2013: 260–261, Scheller 2009: 18–19, Seel 1991: 14, 44, Seel 2003: 58, 250).

Afterwards, the newly formed mental model needs to be balanced with the environment. Does the new information, as it is presented in the model, produce plausibility? Can the problem be successfully solved with the model? If the answer is yes, then the modelling process is concluded, for the time being. If the mental model is repeatedly confirmed in new situations, then it is stored in the long-term memory as a viable schema. If this is not the case, then the modelling process continues until the individual has either formed a viable model or has given up on the problem (Hanke 2006: 52–53; cf. Kanaplianik (EL-Bouz) 2016: 106).

3.3.2   The Concept of the Mental Model

From the perspective of cognitive sciences, a mental model is a special case of a mental representation, a conceptual structure. A person creates

this structure in order to solve a specific problem. It contains relevant features for the specific problem and is, therefore, subjectively plausible (Ifenthaler 2010: 82, Moser 2003: 188, Rieber 1991: 326, Seel 2003: 258). However, mental models are not stable structures fixed in long-term memory. They are constructed on demand in the working memory in order to overcome the challenges of a particular situation (Seel 2003: 258).

The formation of mental models is based on the interaction between human perception and memory (Ifenthaler 2006: 7) as well as on cognitive processes such as calculation, simulation, and prediction. It represents the deepest form of understanding (Jonassen/Cho 2008: 146, Seel 1999: 155; cf. Zwaan/Singer 2003). In addition, the formation of mental models requires a learning ability of the model-creating system (as a competence of the acquisition and construction of world knowledge) (Seel 1991: 28). For its part, the learning ability of the system is linked to the cognitive processes of information assimilation, information processing, storage, and application (cf. Seel 1991: 28).

Despite the existing consensus that the information necessary for model formation is attained via sensory modalities researchers do not agree on the nature of the mental models themselves. Schnotz & Bannert (1999) and Schnotz (2001) view mental models as a form of purely visual representations (based on the theory of Johnson-Laird 1983). On the other hand, Jonassen & Cho (2008) describe mental models as a series of complex dynamic constructions which are simultaneously multidimensional and multimodal (meaning that they contain textual, auditive, and visual elements). The researchers Engelkamp & Zimmer (2006) note that mental models are multimodal: they result from a logical thinking process and are reflected in the shape of textual representation. Dynamic processes, on the other hand, such as motion sequences, are modelled on the basis of images (cf. Scheller 2009: 19). Despite the fact that mental models are closely connected to imagery-based thinking they are not generally dependent on it (cf. Scheller 2009: 20).

Principally, a mental model matches the original content instead of being a mere replicate of it (Seel 1991: 19–20). Structural analogies take a central role in the formation of mental models. However, a complete correspondence in terms of the original content is not necessary (Hanke 2006: 40–41; cf. Ifenthaler 2006, Johnson-Laird 1983, 2004, 2013, Seel 1991). For this reason, mental models do not mirror the complete original structure but actually present cognitive approximations to phenomena of the perceived

or mediated world (Seel 1991: 59). It is the main function of mental models to create a subjective plausibility of the new information and to contribute to problem solution. They are, therefore, tuned to the intentions and goals of the individual creating the model and only include the aspects of a context relevant to the solution of a problem. All other aspects are left aside (Johnson-Laird 2004: 203, Johnson-Laird 2013: 131). This is what makes mental models flexible, incomplete, simplified, unstable, and limited in their applicability (Hanke 2006: 14–15, Ifenthaler 2006: 12, Moser 2003: 188, Seel 1991: 27, 96). Despite these limitations mental models make it possible to draw correct conclusions. The effect of drawing conclusions is made possible by the use of existing knowledge and deductive inferences and **simulation processes** (Ifenthaler/Seel 2013: 132).

3.3.3 Learning-Dependent Progression of Mental Models

We have seen that the formation of mental models is an important part of the process of knowledge acquisition. Learning processes can be classified as processes of knowledge acquisition. You will learn in this section how the concept of mental models can be used to describe learning processes and how these processes can be put to use in the classroom.

Forming a mental model during a learning process is very complex. As long as the information processing is incomplete the internal model of the learner is still under development. The model remains incomplete with many knowledge gaps. As a result, the learner strives to fill the gaps with missing information to attain the completion and alteration of the model (Moser 2003: 184; cf. Collins/Brown/Larkin 1980). The learner operates with the mental model as long as changes continue to appear and knowledge changes. Ideally, the system slowly attains a stable condition where the existing knowledge structure is no longer modified by new information but, instead, is repeatedly confirmed and produces plausibility. This is how a mental model is established as a schema. It is then stored in the long-term memory (Ifenthaler/Masduki/Seel 2011, Ifenthaler/Seel 2011, Ifenthaler/Seel 2013, Hanke 2006, Seel 1991). The goal of the whole learning process ultimately is the development and long-term storage of a schema for problem-solving (cf. Kanaplianik (EL-Bouz) 2016: 109–110).

Mental models are dependent on previously acquired knowledge. That is, the mental models of novices can differ from those of experts despite the fact that they refer to the same topic (Ifenthaler 2006: 2). Experts find it

easier to follow task requirements: they extract and interpret the necessary information and create appropriate analogies on the basis of this information. Novices, by contrast, often have more difficulties to recognize relevant information and, therefore, tend to focus on the superficial traits of an issue (Scheller 2009: 20, Seel 2003: 258). As a result, a mental model develops (in the ideal case) from a novice model to an expert model (Johnson-Laird 1989, Ifenthaler 2006, Seel 2003). In this process, novice models become more differentiated, improved and more and more similar to expert models (Ifenthaler 2006: 19–20). This process can be pedagogically fostered.

The pedagogical external influence on the formation of mental models can be separated into three levels (Ifenthaler 2006: 19–20, Seel 1991: 193–194):

- **declarative level**: concerned with the constant restructuring of the scope and quality of relevant knowledge
- **procedural level**: concerned with the improvement of cognitive processes and heuristics
- **semiotic level**: promotes the competency of the model-creating system representing encyclopaedic knowledge via system symbols.

Accordingly, the following forms of instructional measures are available in order to support the process of model formation:

- on the declarative level: providing necessary knowledge on a topic used for the creation of a mental model in the following steps
- on the procedural level: illustration of structural correlations of contexts in combination with visualizations with the aim of fostering analogies and supporting the formation of inferences
- on the semiotic level: providing appropriate representational aids for 'envisioning' knowledge (Seel 1991: 210).

3.3.4   Mental Models and Imagery-Based Learning Tools

Mental models are closely intertwined with imagery-based thinking, and, therefore, under certain circumstances can be advanced efficiently with different imagery-based learning tools (visualizations) (Seel 2003: 262, Scheller 2009: 21). We will discuss two possibilities in the subsequent sections: the use of instructional models and the use of animations.

Instructional models are visual representations (images, schemas etc) illustrating and explaining complex contexts.
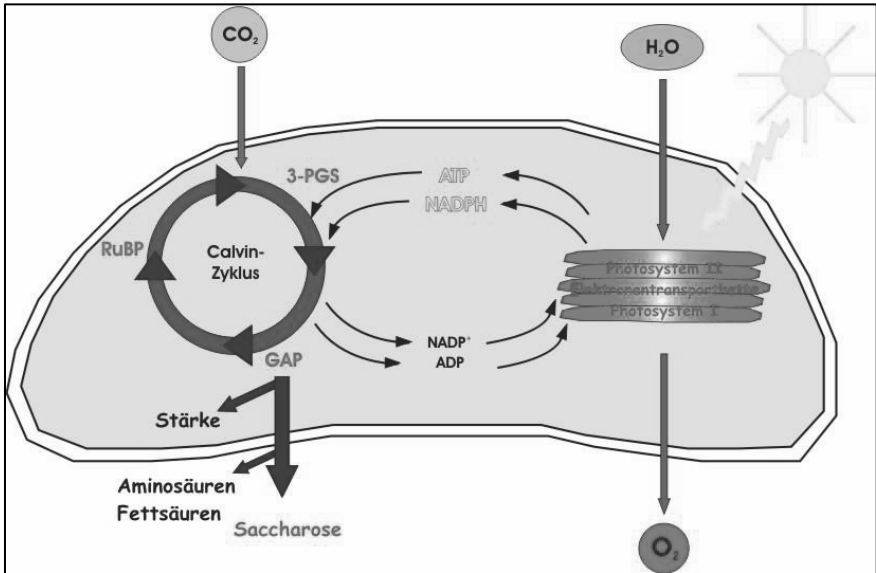
Figure 3.15: Example of a schema on the topic of photosynthesis (Bauersachs o.J.)

Instructional models are

> didactically prepared representations [...], which are intended to support the construction of mental models in relation to the learners' prior knowledge and the specific requirements (problem solving in class or in an everyday situation). (Translated from Ifenthaler 2006: 14)

The structure of mental models can be influenced by the type of visualization (Schnotz/Bannert 1999: 232; also see Schnotz/Bannert 2003). This is the reason why dynamic learning content (processes, movements, etc) is best illustrated with dynamic visualizations. They create dynamic mental models that correctly display all processes. Animations belong to these types of dynamic visualizations.

An **animation** is a simulated motion picture. It displays the movement of a drawn object and elicits the idea of continuous change (Moreno/Mayer 2002: 88, Schnotz/Lowe 2008: 304).

Animations are especially suitable for conveying dynamic contexts as they can represent changes in time and space and refer to dynamic mental models (Betrancourt 2005: 293, Schnotz/Rasch 2009: 412, Roche 2013: 69, Roche/Scheller 2008: 208). When dynamic contexts are conveyed via animations a structural analogy is created between the context and the visualization. This is in contrast to static images. The effort of extracting task-relevant information may be lowered (Scheller 2009: 116–117). Schnotz and Rasch note that animations fulfill two positive functions during the construction of mental models: **enabling** and **facilitating**. Animations enable learners without any prior knowledge or those who have difficulties creating visualizations, to mentally simulate situations. This is the enabling function of animations. If the learner is capable of producing visualizations himself animations can reduce the cognitive load by activating schemas and saving limited cognitive resources. In this way, animations facilitate cognitive processes (Schnotz/Rasch 2005: 57, Schnotz/Rasch 2008: 111; also see Ainsworth 1999, Schnotz 2003). Beyond that, animations can offer the visualization of different phenomena, that is in particular phenomena which cannot be reproduced easily in a typical classroom setting (for instance, a volcano eruption) which are not immediately accessible through visual perception (for instance, electricity) or which can only be conveyed through textual descriptions with great effort (Betrancourt 2005: 288, Roche 2009: 399). Motion has the inherent ability of guiding and focusing attention. Specifically, it can be used to focus the learner's attention on the most important elements of a situation, thereby raising the probability that successful learning may occur (Lowe 2003: 175, Scheller 2009: 114; cf. Kanaplianik (EL-Bouz) 2016: 120-122).

3.3.5 Existing Misconceptions in Leaners and the Conceptual Conflict

Learners who attend lessons are no 'blank slates'. They have their own subjective mindsets, motivations, and prior knowledge. It is often the case that these pre-existing mental models and the students' prior knowledge clash with the information that the students acquire in class. The pre-existing mental models sometimes exhibit gaps, are inconsistent or even faulty,

but still harbor a strong resistance towards change (Ifenthaler 2006: 22, Seel 1999: 158–159). In Section 3.3.2 we have discussed how the subjective plausibility of a mental model allows a person to solve a problem despite a lack of a complete set of information on the subject. While this is a practical advantage it is also dangerous: the mental model despite providing a solution to a problem can be false. The student continues to entertain a misconception (Shute/Zapata-Rivera 2008: 25). Students can have firm beliefs on real phenomena established by everyday experience. With these in mind they enter the classroom where, for instance, they are confronted with a scientific model. The new knowledge is usually more abstract and more complex than the pre-existing mental model already rooted in the student's conceptual system, a model whose subjective plausibility has already been successfully confirmed in the learner's mind. The teacher, therefore, encounters resistance by the student. It is not easy in such cases to convince students to overturn or correct their misconceptions. Overturning the resistance appears only possible through focused external influence (Ifenthaler 2006: 19–20, Seel 1991: 8–9, Seel 1999: 158–159; cf. Kanaplianik (EL-Bouz) 2016: 110–111).

What to do when a learner already harbors misconceptions on a certain issue? On the one hand, not all misconceptions are stable and resistant to change. Some of these misconceptions exist due to a lack of a more plausible alternative. Unstable misconceptions can be subjected to quick and in-depth conceptual change in a short period of time (Smith/diSessa/Roschelle 1993: 152; cf. Brown/Clement 1989). There are also ways of dealing with firmly established misconceptions, however, there is no consensus among researchers on how that is best achieved. One approach suggests that the students externalize their misconceptions via mindmaps, schemas, or similar visual aids, and, subsequently, compare them with the correct concepts. By proceeding in this way, students learn to recognize anomalies and inconsistencies in their own concepts and are encouraged to edit and revise them (Jonassen/Strobel/Gottdenker 2005: 20–21). However, an explicit confrontation such as the one just described could also lead to a strengthening of a misconception. In such cases, the teacher should not attempt to directly combat misconceptions, or to replace them with the correct model (Smith/diSessa/Roschelle 1993: 154). The more constructive path is to incite **conceptual conflict** in the students and offer them an experiential basis for the complex and gradual process of changing their misconceptions/mental models (Hewson/Hewson 1984, Jonassen/

Strobel/Gottdenker 2005: 30, Seel 1991: 211, Smith/diSessa/Roschelle 1993: 154).

The conceptual conflict is evoked by a discrepancy between events experienced by and the expectations of the students. Hence, the nature of a conceptual conflict can be described as follows:

> This concept is closely linked to the idea of questioning 'cherished' explanatory approaches and making the necessity of conceptual changes clear. In other words: the 'conceptual conflict' aims at restructuring world knowledge. (Translated from Seel 1991: 211)

The conceptual conflict is not a procedure which simply leads to the substitution of one's own model through an expert model. Instead, it is a complex pattern of changes on a systemic level incorporating interconnected knowledge elements (Smith/diSessa/Roschelle 1993: 154). It is the first step of several towards the reorganization and restructuring of mental models: First, the student needs to become aware of the contradiction between his environment and his own conceptual system. Ideally, this step causes a desire for change (Jonassen/Strobel/Gottdenker 2005: 30). In order to help the student to get that point the teacher may offer the students additional (factual and functional) knowledge that should be reasonable on a subjective level as well as consistent, plausible, and productive (Seel 1991: 212–213).

3.3.6 Diagnosing Mental Models

When we consider what has been discussed in the previous section, we must ask ourselves how we can track the formation of mental models.

Diagnosing mental models offers the promising possibility of gaining insights into the cognitive systems of students. Such insights are not easily generated by typical evaluations (such as various tests) (Schütze/Streule/Läge 2011). It should be noted that internal mental models as dynamic multimodal representations are not immediately accessible for analysis. To analyze them we need to transfer them into an external representational form (Engelkamp/Pechmann 1993: 14, Hanke 2006: 58, Ifenthaler 2006:

23, Seel 1991: 162). During **externalization** a mental model is transformed and adapted to external semiotic systems. By doing so one needs to pay attention to the fact that the mental model at the core of the externalized model is not completely identical with its externalization (cf. Jonassen/Strobel/Gottdenker 2005). It is, therefore, highly relevant to find the appropriate form for the externalization, a form that renders possible an adequate and exact representation of a mental model (Hanke 2006: 142, Ifenthaler 2008: 57, Ifenthaler 2010: 83). Suitable methodologies and instruments include the thinking aloud method, the structure-laying technique, concept mapping tools, tests for casual models, and surface structure comparisons (Ifenthaler 2006: 23). Computer-based tools are the most promising instruments for the diagnosis of mental models (cf. Jonassen/Cho 2008). We will describe several in the following paragraph.

Hanke (2006) attempted to develop an instrument for surveying mental models; however, the developed learning environment exhibited several drawbacks (such as not considering synonymous terms) (Hanke 2006: 142). The combined HIMATT software (*Highly Integrated Model Assessment Technology and Tools*) represents a step further in the development of computer-based analyses. The software combines several qualitative and quantitative methodological approaches for the diagnosis of mental models in a single environment. The HIMATT software also makes it possible to analyze structure, complexity, integrity, semantics, and propositional compounding (Ifenthaler 2006, 2010, Pirnay-Dummer 2006, Pirnay-Dummer/Ifenthaler/Spector 2010). A further development of the HIMATT is the AKOVIA software (*Automated Knowledge Visualization and Assessment*) used for the visualization of mental models on the basis of written texts (Pirnay-Dummer 2011, Pirnay-Dummer/Ifenthaler 2010, 2011). Both tools have been empirically tested (Mistree/Ifenthaler/Siddique 2013 for AKOVIA). They were able to determine changes of the mental models in the respective study participants.

3.3.7   Summary

- Mental models represent flexible and dynamic knowledge structures closely interconnected with imagery-based thinking. These models are constructed in the working memory when new information cannot be assimilated into existing cognitive structures.

- Mental models are meant for problem-solving. This is the reason why the models produce subjective plausibility and are used for illustration and simplification of contexts of the extralingual world. They are also used for formation of analogies and mental simulations of processes.

- Mental models can be developed and modified through learning processes during which the student (ideally) quickly advances from a novice model to an expert model. The final result is that the mental model is stabilized and stored as a schema in the long-term memory.

- The formation of mental models can be externally influenced by instructional measures such as supporting the conceptual system on various levels, offering different methods of learning as well adequate visualization types, and using instructional models and animations.

- If the students already entertain misconceptions these can be changed by triggering conceptual conflicts.

- The analysis of mental models via computer-based instruments offers promising possibilities for tracking and assessing the changes in a learner's knowledge system.

3.3.8   Review Questions

1. Explain the process behind the formation of mental models.
2. Describe the most important properties of mental models.
3. How is a mental model constructed during the learning process?
4. How do animations assist in the formation of mental models?
5. How can a teacher deal with students' misconceptions?

4   Grammar

Humans have been fascinated with the phenomenon and the structure of language for thousands of years. This chapter focuses on the term as well as the concept of grammar. The term itself has its origins in antiquity, though at that time it was associated more strongly with philology. With new insights from the various modern linguistic subdivisions (such as neurolinguistics, research into language acquisition or the phenomena of language change), new questions arise constantly in the area of grammar. It is a goal of language acquisition research to define grammar in a way that makes it possible to explain the phenomena in terms of first and second language acquisition. Up to this point, theories were able to describe language production, but they were not adequate: they were not able to explain the process of acquisition itself (see Chapter 7 in this volume). Furthermore, researchers always examined the influence of specific languages on human thought (assuming linguistic relativity) which is a concept that goes back to Wilhelm von Humboldt (also see Chapter 5.2). Researchers today use innovative methods such as eye-tracking to gain new insights which may have consequences for the underlying theory of grammar.

In the first part of this chapter, we will discuss what grammar is in general and which assumptions with regards to language (and language production) underly certain grammar theories. We will elaborate on the differences between various approaches. Following that, we will move on to focus on the theory of construction grammar. We continue in Chapter 4.2 with a more in-depth consideration of construction grammar and its various trends, similarities, and differences as well as the term 'construction' itself. The third part, Chapter 4.3, deals with the mental representation of constructions taking multilingualism into account.

4.1 Approaches to Grammar

Anne-Katharina Harr

> The first part of this chapter deals with the concept of grammar. After defining the term independently from theories, we will present three different grammar theories. The starting point will be de Saussure's understanding of language as a system of signs. In de Saussure's theory, grammar defines the rules for linking signs. The second theory presented will be Chomsky's theory of generative grammar which assumes that humans are born with an inherent so-called universal grammar. This inherent grammar includes a system of transformation rules which speakers use to produce sentences. Apart from these concepts, the dichotomy between Chomsky's I-/E-language will be discussed critically. Finally, we will present construction grammar as a usage-based approach. The main representative of the usage-based approach is Michael Tomasello. Tomasello assumes that grammar emerges from the conventionalization of linguistic structures, and that there is no inherent language specific disposition for language learning. This view is subsequently combined with a constructional approach to grammar, to which we will return again in Chapter 4.2.
>
> **Study Goals**
>
> By the end of this chapter, you will be able to:
>
> – give a differentiated definition of the term 'grammar'
> – classify and explain the views of de Saussure and Chomsky, as well as those of functional grammar and construction grammar
> – critically differentiate between the approaches and identify their boundaries.

4.1.1 The Term 'Grammar'

The term **grammar** originates from the Greek noun *γραμματική* (grammatikē – ʽknowledge of writingʼ) which in turn is derived from *γράμμα* (grámma – ʽalphabet letter, writing, post letterʼ) (Bußmann 2008: 259). In

antiquity, the term referred to all arts concerned with composing and interpreting written texts. In the Middle Ages, grammar merely referred to the theory of style and language of the classic languages, especially Latin. Grammar, along with rhetorics and dialectics, represents an area of the trivium, that is, the first three of the seven liberal arts at medieval universities, which all students had to deal with at the beginning of their studies (cf. Tavoni 2000). Already in Humanism the term is used less restrictively and was also applied to non-classical languages. This shows that during that time, grammatical structures were also attributed to other languages (for instance indigenous languages such as Nahuatl in Mexico and Nyulnyulan in Australia, beside the national languages such as German or Russian) that seemed worthy of description (cf. Stangl 2010: 86). In modern linguistics, the term 'grammar' is used to describe different subject areas (cf. Bußmann 2008: 259f.):

(1) Traditionally, grammar refers to the knowledge or teaching of the morphological and syntactic regularities of a natural language. Linguistic sub-areas such as phonetics and semantics are usually left out (cf. Helbig 2001).

(2) Grammar is considered as a structural system of rules that underlies the processes of language production and comprehension (cf. de Saussure's approach in Section 4.1.2).

(3) Chomsky considers grammar (as discussed in Section 4.1.3) as a linguistic theory, that is, as a model for mapping language competence (Chomsky 1965: 40).

(4) In encyclopaedias, grammar is used metonymically as a key word for the systematic description of the formal regularities of a language.

The relevant linguistic reference works (such as Bußmann 2008 or Glück/Rödel 2016) do not take into account the view of grammar underlying construction grammar, which is explained in more detail in Section 4.1.5.

In addition to these distinctions, there are further aspects in the description of grammar(s), which cannot be discussed in detail here (for example descriptive/normative/didactic grammar, corpus grammar and so on; for more details, see Glück/Rödel 2016 and Helbig 2001).

If we start from a narrow definition of the term, which subsumes the morphosyntactic aspects of a language under grammar, the question arises why we need grammar at all. That we need the entries of the lexicon to put meanings into words seems obvious. However, it is far less obvious why natural languages have regularities, for example, in inflection or in word order. The reason for this is the fact that it is only through the use of grammar that we are able to express unambiguously complex facts that do not only refer to the here and now, and in this way to communicate economically with others. Furthermore, it is assumed that humans are only capable of higher cognitive performance through the use of language, as we use language to solve problems (cf. Baldo/Dronkers/Wilkins/Ludy/Raskin/Kim 2005, Gentner 2003). It is not necessary to speak our thoughts out loud, we often silently verbalize our thoughts in our head. Vygotsky (1992: 224) calls this process **inner speech**.

Important for the following chapters is the differentiation of the term depending on the underlying conception of language, i.e. the differentiation of the term 'grammar' on the basis of the theory of language, which forms the basis of the respective linguistic trend. The consideration of this aspect is particularly relevant in the use of teacher and learner grammars, since the structure and presentation of the material depends on it.

4.1.2   The Perspective of Ferdinand de Saussure

When dealing with grammar, it is inevitable to mention the name of Ferdinand de Saussure (1857-1913). His post-humously published *Cours de linguistique générale* (1916) is the starting point for European structuralism. In order to grasp de Saussure's understanding of grammar, we will first discuss his definition of language. De Saussure distinguishes between **faculté du langage**, **langue**, and **parole**. 'Faculté du langage' is the human ability to produce language and involves neuro-physical processes. In contrast, the term 'langue' refers to a conventionalized system of signs in which **signifiants** are arbitrarily assigned meanings (**signifiés**) as shown in Figure 4.1 using the example of a tree.
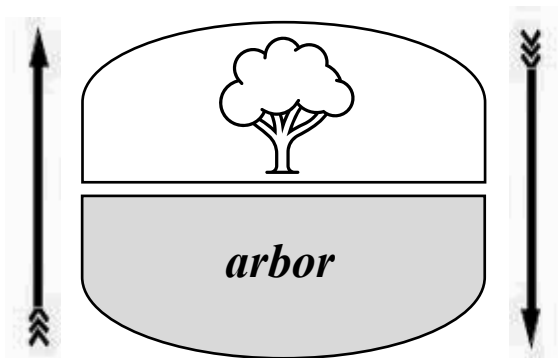
Figure 4.1: De Saussure's concept of signs (cf. de Saussure 1969: 99)

The abstract entity of langue which includes sounds, words, and phrases, is a social product which exists exclusively in the minds of speakers and is passed on by a kind of tacit agreement among members of a language community (conventionalizing). In contrast, 'parole' is defined as the language-specific performance of langue, which is executed individually by the speakers (cf. de Saussure 1969: 13). Syntactical processes are the arrangement of phrases in a single sentence. These are, strictly speaking, not a phenomenon of langue but are a phenomenon of parole instead. Apart from syntagmata which are a sequence of linguistic expressions, "construits sur des formes régulières. En effet, comme il n'y a rien d'abstrait dans la langue, ces types n'existent que si elle en a enregistré des spécismes suffisamment nombreux" ["To the language, and not to speech, must be attributed all types of syntagmas constructed on regular patterns. Since there is nothing abstract in linguistic structure, such types will not exist unless sufficiently numerous examples do indeed occur"; de Saussure 1983: 123] (Harris 1987: 173).

When a syntagma has to be analyzed as a regular form, that is, how often it must occur in the language, is not discussed by de Saussure and is not the focus of his interest.

According to de Saussure, language should be studied independently from its use. Nevertheless, de Saussure is aware of the interdependency of the two systems: parole is both instrument and product of langue (de Saussure 1969: 37). Therefore, linguistic change can only happen through the parole. Speakers change certain conventions in their daily language use and over time, these changes become part of the langue where they become the norm.

From this it is evident that de Saussure, like those structuralists who took up his approaches, sees language primarily as an ordered system. Therefore, the goal is to describe the structure of the system on the basis of a corpus of synchronous language data: this linear sequence of units has to be segmented, and these units then have to be classified based on their paradigmatic relations (i.e. elements of the same category). Language, or more specifically, the langue, is thus seen as the totality of devices which determine the structure of individual speech acts (cf. Bierwisch 1971). De Saussure's langue can therefore be equated with one of the meanings with which grammar is defined: it is "a system of rules capable of precise formulation, which when applied repeatedly, generate, […] all the sentences of a language" (Bierwisch 1971: 48).

4.1.3 Chomsky's Understanding of Grammar

As before, we first need to look at Noam Chomsky's definition of language, on which he has built his understanding of grammar. Chomsky's understanding of language is at first sight fundamentally different from de Saussure's, even if both focus on the language system.

Chomsky defined language "as a set (finite or infinite) of sentences, each finite in length and constructed out of a finite set of elements" (Chomsky/Lightfood [1957] 2002: 13; cf. Chomsky [1980] 1989: 220). From this quotation one of Chomsky's basic assumptions about language can already be gleaned: Language is based on the principle of **recursion**. This principle states that an unlimited number of expressions can be produced from a limited number of units. This statement can refer to words as well as sentences. Thus, recent generative work assumes that the innate predisposition for language acquisition is limited to the principle of recursion (cf. Hauser/Chomsky/Fitch 2002).

The above definition of language is very global and can be applied to other formalized systems such as mathematics. According to Chomsky, a linguistic system that consists of sounds and meanings encompasses three different categories of units (cf. Chomsky [2000] 2007: 10):

(1) **Features**: the properties of sounds and meanings

(2) **Lexical items** denote those items that are composed of features.

(3) **Complex expressions**: units consisting of lexical items.

Features and lexical items represent the limited means from which, via combination, can be generated an infinite number of complex expressions. This term can be equated with sentences. Consequently, Chomsky limits his concept of grammar to syntax.

In his early works, Chomsky distinguished between **competence** and **performance**. He later replaced this dichotomy with the conceptual pair internalized-language (**I-language**) and externalized-language (**E-language**). This distinction has several parallels to de Saussure's concepts of langue and parole. Language competence (just like as the langue) underlies language use, "[but] is not realized in any direct or simple way in behaviour" (Chomsky 1972: 4). Performance, on the other hand, reminiscent of de Saussure's concept of parole, is influenced by various factors such as "memory, time, and organisation of perceptual strategies that are not matters of grammar" (Chomsky 1972: 117). Similar to competence, I-language is considered as the mental representation of an ideal speaker's language knowledge (Chomsky 1986: 22). Consequently, a specific grammar is the theory of the respective I-language (Chomsky 1986: 29). In contrast to describe E-language, one considers empirical language data and then describes its properties (Cook/Newson [1991] 1998: 36). Chomsky views E-language as a "construct independently of the properties of the mind/brain" (Chomsky 1986: 20). Therefore, E-language cannot be equated with performance.

According to Dürscheid (cf. 2012: 126), Chomsky's focus is on the formulation of general laws. The linguistic data serve to modify these, if necessary. Chomsky's interest therefore consists only in the description of the I-language. According to him, the E-language, which structuralism had in focus, only plays a minor role in the establishment of a theory of language (cf. Chomsky 1986: 24–26).

For a long time, scholars of **generative grammar** assumed that every person was born with a **universal grammar** (UG), enabling her to acquire any language of the word. The UG consists of general principles and language-specific parameters, that are set depending on the type of input (for more details see Chapter 6.1). It is not the goal of generative grammar to describe the grammar of one specific language. In contrast, UG aims to uncover the general regularities that form the basis of all languages. This so-called deep structure is the abstract level underlying the concrete realization of linguistic forms with their differences in word and phrase order called surface structure.

Since the turn of the millennium, representatives of generative grammar itself have more and more frequently been questioning the assumptions presented. In particular, the task-specific innate universal grammar is hardly compatible with recent findings from language acquisition research (cf. Fanselow 2002: 233). That is why, as mentioned above, only the principle of recursion is considered innate by Chomsky himself.

However, generative approaches did not stagnate at this point, but have evolved to a large extent. Many advocates of generative grammar have turned to optimality theory over the past years, a meta-theory that consists of different components and principles. This approach is used to explain first, second as well as foreign language acquisition, with a focus on phonology (cf. Bhatt/Bolonyai 2011, Fikkert/de Hoop 2009, Hancin-Bhatt 2008).

4.1.4   Functional Grammar

The general characteristics of functional grammar, as presented below, also apply to construction grammar a theory we will focus on in Section 4.1.5 and that will be elaborated in even more detail in Section 4.2.

Functional grammars are usually grouped together as those streams which explicitly distance themselves from formal grammar theories like generative grammar. All functional approaches are of the opinion that language cannot only be analyzed in isolation, but only in relation to its role in interpersonal communication (cf. Smirnova/Mortelmans 2010: 13). Therefore, language use is not excluded, instead but one tries to infer the underlying structures by analyzing the communicative and cognitive functions of language. In contrast to Chomsky, the focus is also on areas other than syntax.

> In the functional paradigm, on the other hand, a language is in the first place conceptualized as an instrument of social interaction among human beings, used with the intention of establishing communicative relationships. Within this paradigm one attempts to reveal the instrumentality of language with respect to what people do and achieve with it in social interaction. (Dik 1997: 3)

Compared to construction grammar, which we will be discussing in the next chapter, the goal of functional grammar as it was established by Dik (1997) is to specify all possible linguistic expressions with the help of generalizations and their expression in grammatical rules (Jungen/Lohnstein 2006: 101).

The limitations of generative grammar, which functionalists often point out, will be illustrated by an example that shows why it is necessary to consider utterances in their discursive context (cf. Welke 1994: 16; also cf. Welke 2005):

(1) *The dining hall is next to the library.*

(2) *The library is next to the dining hall.*

In the first sentence (1) the localization of the dining hall is seen from the library, while in sentence (2) the perspectivation is reversed. Both sentences are grammatically correct, however, they differ with regard to their function in discourse. Sentence (1) is the answer to the question *Where is the dining hall?* But not sentence (2). The change of perspective consequently determines how the subject position is filled, which cannot be explained purely through syntax. Only by examining the sentences from a functional-pragmatic perspective, we can explain why the two sentences are not equivalent (cf. Dürscheid 2012: 174). Functionalists advocate taking into account not only the rules for the formation of linguistic expressions (at the levels of semantics, syntax, morphology, and phonology), but also the pragmatic rules that define the conditions for the use of utterances. In example (1) and (2) this would be the perspective of the speaker. Dik (1997: 4) emphasizes that only an explanation of the linguistic rules through their functionality within the discourse is powerful. Consequently, grammar rules should only be traced back to the rules and principles of social and communicative interaction (Jungen/Lohnstein 2006: 102).

Representatives of formal linguistic theories counter the functionalists that their approach, in turn, cannot explain certain phenomena such as the incorrect sentence-final verb position in main clauses. We will not go into the theoretical disputes between the proponents of the two positions here, but it should have become clear that there are two positions which differ fundamentally in the importance they attach to communicative-functional aspects.

4.1.5 Construction Grammar

Construction grammar that we will introduce in this chapter serving as a transition to the following two chapters differs in several aspects from functional grammar, in particular with regard to the central role of construction and its definition. Construction grammar views language as a network of form-meaning pairings, called constructions. In this approach, a construction is a conventionalized symbolic unit where, "all levels of grammatical description involve such conventionalized form-meaning 'pairings'" (Hoffmann/Trousdale 2013: 1). Hence, the term 'construction' is based on an extended definition of de Saussure's concept of signs that includes morphemes, words, idioms, and abstract sentence patterns, as example (1) and (2) illustrate.

(1) Plural morpheme -*s*: N-*s*/PLURAL as in *car-s* or *apple-s*

(2) Lexically fully specified idiomatic expressions: *live like a lord*, *hit the mark*

This already shows that there is no longer a dichotomy between lexicon and grammar, but that a continuum is assumed. However, as will be explained in Chapter 4.2 construction grammar is not a uniform model, but subsumes different theoretical currents, all of which assume that human language consists of signs on all levels (cf. Fischer/Stefanowitsch 2008: 3).

At this point it is necessary to mention **cognitive grammar**, which Langacker established in his foundational work in 1987. His main aim was to distinguish himself from the generative models and not to explain language by innate rules, but to put the cognitive aspect in the foreground. When a speaker wants to express a concept, he has a number of options at his disposal. Which formulation he or she chooses now depends on the one hand on the concept itself, but un the other hand also on the situational context and the conventionalized units (ranging from morphemes to specific linking patterns). Smaller units such as morphemes can be part of larger units (words), and these can again be part of sentences. The units overlap with each other, that is why Langacker's (1987: 73) definition of grammar differs fundamentally from Chomsky's: "The grammar of a language is thus a vast inventory of units structured in hierarchies that overlap and intersect on a massive scale".

As will be explained in Section 4.2.3, Langacker's cognitive grammar (1987) differs significantly from construction grammar in certain aspects.

Nevertheless, both currents share crucial characteristics, such as the assumption of a lexicon-grammar continuum. Therefore, Langacker's ideas have been taken up and were further developed mainly by cognitive-usage-based approaches within construction grammar (cf. Fischer/Stefanowitsch 2008: 2).

So far, three basic assumptions of construction grammar have already been stated:

(1) Construction represents the only relevant descriptive category for language.

(2) The structure of language can be described simply by constructions of varying degrees of abstraction.

(3) Consequently, there is a continuum between lexicon and grammar.

In the following, we will now discuss two further points in which the assumptions of construction grammar and formal approaches differ: language acquisition and the concept of language competence.

Construction grammar approaches, especially those that consider themselves usage-based, aim to replace the mathematical view on language prevalent in generative grammar with a psychological focus (cf. Tomasello 2000a, 2003, 2009). Representatives of this approach criticize the classic concept of language as a system of signs, which is characterized by grammatical rules. They prefer to speak of linguistic patterns and regularities. As a result, language consists of "more cognitively sophisticated learning and abstraction processes" (Tomasello 2000a: 247). This means that a number of purely cognitive abilities are necessary for language acquisition, such as the ability to form analogies or to abstract. Children are not born with a UG, they rather use their general cognitive as well as their socio-pragmatic abilities to acquire language. They observe how adults use specific constructions and relate them to their intended meaning (Tomasello 2009: 79). Children begin to successively abstract more and more abstract schemata from concrete utterances. They are able to use and combine these abstract schemata productively with increasing creativity (cf. Lieven/Behrens/Speares/Tomasello 2003, Lieven/Tomasello 2008). This process will be discussed in more detail in Chapters 4.2 and 7.1.

The main characteristic of language is therefore its role as a communicative system within a language community (cf. Lyons 1970: 7), which is passed

on from one generation to the next. Grammar is just a derivative that copes with the functional demands that 'packaging' a message requires.

> The grammatical dimension of human linguistic communication consists in the conventionalization of and cultural transmission of linguistic constructions – based on general cognitive skills, as well as of shared intentionality and imitation – in order to meet the functional demands of the three basic communicative motives, leading to a grammar of requesting, a grammar of informing, and a grammar of sharing and narrating. (Tomasello 2008: 326)

Linguistic competence, in a functional sense, means the mastery of all units and patterns of a specific language abstracted from input by general cognitive abilities. Linguistic patterns are considered as being always in a state of flux, as the speakers continuously and subconsciously analyze their input and adjust their linguistic knowledge accordingly. Therefore, the language-knowledge is considered to be much more extensive and complex in construction grammar approaches as compared to the core grammar that underlies I-language in formal approaches. The description of grammar cannot be achieved by formulating regularities, since language is understood as something dynamic that is constantly changing and whose use or meaning depends largely on the context. Consequently, grammar is not modular and not derivational (cf. Fischer/Stefanowitsch 2008: 5), it is rather influenced by cognitive factors and does not rely on the application of transformational rules to generate sentences. Nevertheless, a broader empirical base is needed from neurolinguistics and work through computer simulations to see how construction grammar can be modelled neurocognitively and thus invalidate the arguments of formal linguists (Rostila 2011).

4.1.6 Summary

- The term 'grammar' has various meanings, some of which are closely related to particular theories of grammar or language.
- Both the structuralist de Saussure and the main representative of generative grammar, Chomsky, who both study primarily the

abstract properties of the language system, the units of language and their relationship to each other, view language as something static.

- De Saussure's and Chomsky's views have been criticized for not paying attention to parole and E-language, even though language use has its own regularities. De Saussure's work focused primarily on the sign, i.e. the lexicon; Chomsky focused on syntax. For this reason, neither approach constitutes a comprehensive theory of grammar.

- Representatives of functional grammar and construction grammar focus on language use. They, therefore, view language as a dynamic, constantly changing system.

- Particularly the usage-based approaches of construction grammar can explain certain phenomena of language acquisition (such as different acquisitional patterns) more simply and economically than generative models.

4.1.7　Review Questions

1.　Why and for what reason do we need grammar in the narrower sense?

2.　What does de Saussure mean by the terms 'langue' and 'parole'?

3.　How do representatives of the generative approach define grammar?

4.　What is the functionalists' critique of generative grammar?

5.　What are the new aspects brought into play by construction grammar?

6.　What does language knowledge look like according to advocates of construction grammar?

7.　How do the functional approaches differ from formal ones?

4.2 Construction Grammar – Basic Ideas

Nikolas Koch

In this chapter as well as in the next, we will develop the basic criteria of the approaches that are ascribed to construction grammar. Construction grammar is not a uniform theory, but consists of a series of approaches to grammar theory. All of these approaches share fundamental perspectives on language knowledge, such as the conviction that it must be the goal of language and grammar theory to describe and explain language knowledge with a single model. This is based on the notion that language knowledge can be captured with the format of construction. This conviction is shared by all the different approaches of construction grammar. We will first present the common characteristics of the various approaches within construction grammar, and subsequently explain the concept of construction with various examples of types of constructions. Next, we will discuss the idea of argument structure constructions, first presented by Goldberg (1995). Argument structure constructions present an all new understanding of language structures. We will conclude with an introduction to the most important theoretical currents of construction grammar.

Study Goals

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

- name and explain the basics of construction grammar approaches
- understand the differences and similarities between various construction grammar approaches
- explain the concept of construction and the resulting relation between syntax and lexicon
- explain constructions with respect to formal features and content
- explain the exceptional features of argument structure construction.

4.2.1　Introduction to Construction Grammar

Over the last thirty years, construction grammar and its various currents have established themselves as a serious alternative to dominant generative and formal approaches (see Chapter 4.1) for describing and explaining language. The term 'construction grammar' however does not apply to a single theory of grammar, but to a group of theoretical approaches. Most of these approaches share the central premises of cognitive linguistics, specifically in the area of grammar. The following five core concepts serve as a basic premise (cf. Koch 2019, Goldberg 2013: 15-16, Smirnova/Mortelmans 2010: 135).

(1) **Grammatical constructions**: Every utterance in a language, no matter how abstract or complex, always links form with meaning. This is true for traditional lexical units (words) as well as larger linked constituents such as ditransitive constructions (see Section 4.2.3). This rescinds the strict separation of lexicon and grammar practiced in the vast majority of other theories.

(2) **Surface structure**: Different descriptive levels of grammar, such as in Chomsky's generative grammar are rejected (see Section 4.1.3).

(3) **Construct-i-con**: Constructions of varying degrees of complexity and abstractness comprise the grammar of a language in form of an interconnected network. The constructions within this network are connected via various hereditary relations (see Chapter 4.3 and Diessel 2023). This common descriptive level is called the construct-i-con, a term which fuses the words construction and lexicon.

(4) **Learnability**: A language-specific genetic predisposition is not assumed. Grammar is learned on the basis of linguistic input and general cognitive principles, and hence is not an inherent ability.

(5) **Usage-based**: The term 'usage-based' means that language structure emerges from language use, and children build up their language relying on their general cognitive skills. Usage-based approaches typically draw on cognitive processes, such as categorization, analogy, and chunking to explain language structure and function. A distinctive feature is that linguistic knowledge consists not only of lexical knowledge and abstract syntactic knowledge, but also contains generalizations of different degrees of specificity.

> The last assumption is not shared by all approaches in equal measure, but nevertheless constitutes a central interface for theories of language acquisition, language production as well as language change (cf. Goldberg 2013: 16, Goldberg 2019).

The various approaches do not value all of these concepts in equal measure. Still, these are characteristic core concepts of constructional grammar theories. Apart from these five core concepts, there are numerous theoretical premises by which the various approaches of construction grammar can be categorized (cf. Fischer/Stefanowitsch 2008: 8–14).

4.2.2 The Concept of Construction

The definition of construction varies between the different theoretical currents within construction grammar (see Section 4.2.4). We will present the definition of construction from the perspective of cognitive construction grammar (CCxG), which is the approach that has been the most discussed recently.

One of the most important principles of construction grammar theories is the conviction that all areas of a speaker's linguistic knowledge can be accounted for and explained on only one linguistic descriptive level. The construction is the central element in this process. Goldberg defines construction as follows:

> Any linguistic pattern is recognized as a construction as long as some aspect of its form or function is not strictly predictable from its component parts or from other constructions recognized to exist. In addition, patterns are stored as constructions even if they are fully predictable as long as they occur with sufficient frequency. (2006: 5)

A construction, thus, represents a pairing between form and meaning. Furthermore, Goldberg names two additional criteria. Either form or meaning needs to be non-compositionally determinable. This means, for instance, that the meaning of a construction lies beyond the sum of its combined partial meanings. This is the case when parts of the construction are already mentally available (first criteria) (cf. Ziem/Lasch 2013: 11). The first

criterion no longer applies when a construction occurs with sufficient frequency (second criterion).

Figure 4.2 illustrates how the form of a construction can be linked with different kinds of linguistically relevant information. These include syntactical, morphological, or phonological features (cf. Boas 2013: 234). The meaning side of a construction contains semantic information alongside with conventional aspects associated with the function of the construction.

An example of a conventionalized aspect would be the knowledge of discourse features, which enables the speaker to delete obligatory arguments from utterances, as in the sentence *The tiger killed again* (Goldberg 2006: 190). What is missing here is the normally obligatory addition of the direct object (*who* or *what did the tiger kill again?*). Despite that, interpreting this statement is simple. Constructions' aspects of form and meaning are indivisibly connected via a symbolic relationship. The parallel to de Saussure's concept of signs is apparent here (see Section 4.1.2; cf. Taylor 2002: 38–44). Construction grammar, like many other theories, assumes that the assignment of form and meaning is arbitrary. Perceiving constructions as conventionalized **form-meaning pairings** has a considerable effect on the structure of grammar (cf. Boas 2013: 234, Hilpert 2014). Consequently, as language knowledge is always a connection between form and meaning, scholars of construction grammar assume a direct link between syntax and semantics (cf. Goldberg 1995: 7). Hence, they reject dividing syntax and semantics into separate mental models:

> Each construction will be a form-meaning pair (F,M) where F is a set of conditions on syntactic and phonological form and M is a set of conditions on meaning and use. (Lakoff 1987: 467)

Lakoff's definition can be represented graphically as seen here:

CONSTRUCTION (frequency)

FORM

Syntactic properties
Morphological properties
Phonological properties

Symbolic correspondence (link)

Semantic properties
Pragmatic properties
Discourse-functional properties

(CONVENTIONAL) MEANING
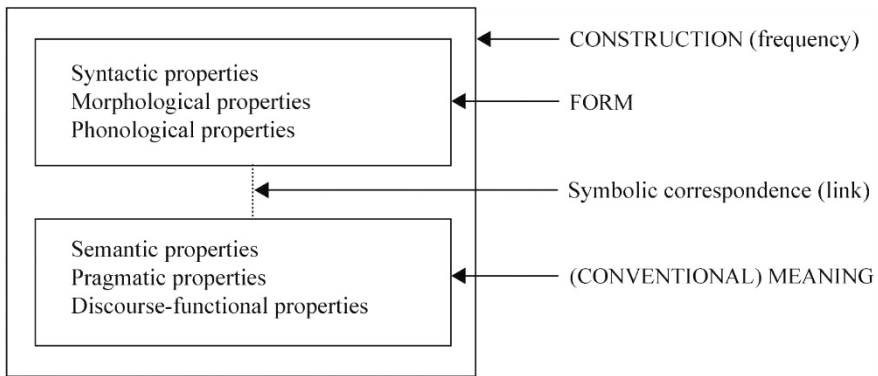
Figure 4.2: The structure of a construction according to Croft (2001: 18)

4.2.3 Types of Constructions

Constructions are not restricted in terms of abstractness or complexity. All linguistic levels, be it morphemes, words, phrases, or whole sentences, count as form-meaning pairings and, therefore, as constructions (cf. Boas 2014: 44–45, Goldberg 2006: 5). This is the point in which the concept of construction strongly diverges from de Saussure's concept of signs. Proponents of the concept of construction assume that there is no restriction whatsoever on the degree of abstractness or complexity. Lexical morphemes such as the words *dog* or *pretty* count as syntactically simple constructions and concrete in their meanings. The idiom *to keep an eye on someone* is quite the opposite: though it is also concrete, it is syntactically complex. However, constructions can also be represented mentally in a completely abstract way, such as the ditransitive construction [[NP$_{SUB}$] [VP] [NP$_{OBJ}$] [NP$_{OBJ}$]]. However, whether a completely abstract level of linguistic knowledge actually exists and is used by speakers is an issue which is discussed extensively in construction grammar (cf. Ambridge 2020a, b, Goldberg 2019).

Constructions are classified in a continuum between their degree of abstractness and specificity on the one hand and their complexity and simplicity on the other hand. All constructions of a language can be located on this continuum. Goldberg (2013: 17) offers an overview of the various levels of constructions regarding complexity and abstraction (for English, see also Hoffmann 2022). This list is necessarily incomplete as the description of language by constructions is exhaustive:

Construction	Examples
Word	*Iran, another, banana*
Word (partially filled)	*pre-N, V-ing*
Idiom (filled)	*going great guns, give the Devil his due*
Idiom (partially filled)	*Jog <someone's> memory, <someone's > for the asking*
Idiom (minimally filled) The Xer the Yer	*The more you think about it, the less you understand*
Ditransitive construction: Subj V Obj1 Obj2 (unfilled)	*He gave her a fish taco, He baked her a muffin*
Passive: Subj aux VPpp (PPby) unfilled)	*The armadillo was hit by a car*

Table 4.1: Selection of constructions with varying levels of complexity and abstraction according to Goldberg (2013: 17)

Table 4.1 illustrates how the formal features of constructions such as size and complexity do not necessarily match content features for instance abstractness and specificity. Small or barely complex constructions can be specific, as seen in the word *banana* but can also show a higher degree of abstraction such the partially filled word *V-ing* into which the verb *play* can be inserted, for example, to build the word *playing*. In the same way, complex constructions can be specific, like the idiom *give the Devil his due*. Ditransitive constructions, in contrast, are also complex constructions, but display a higher degree of abstractness. The example of the ditransitive construction illustrates how constructions can be connected and combined to create linguistic expressions. In this way, it is conceivable that the concrete words *Maria, give, Peter, the book* can be inserted in the ditransitive construction [[NP$_{NOM}$] [VP] [NP$_{OBJ}$] [NP$_{OBJ}$]]. We can conclude, therefore, that we can distinguish between three dimensions of linguistic knowledge within usage-based, cognitive approaches (cf. Koch 2019: 60):

- **Specific constructions**: fully lexicalized constructions such as (complex) words, established multi-word expressions, grammatical phrasemes, and proverbs

159

- **Semi-specific constructions or so-called frame-and-slot patterns**: partially lexicalized constructions such as derivational and inflectional morphemes, schematic idioms, or schematic constructions with lexically specific elements ([[NP$_{NOM}$] [*gives*] [NP$_{DAT}$] [NP$_{ACC}$]])

- **Fully abstract constructions**: schematic constructions such as argument structure constructions. As mentioned before, this level of linguistic knowledge is quite controversial within construction grammar.

The approach of cognitive construction grammar (CCxG) (see Section 4.2.4.1) includes a special type of construction: argument structure constructions such as the ditransitive construction. The central definition of linguistic structures as form-meaning pairings can also be illustrated more clearly here. Most grammar theories assume that the verb determines the argument structure of an utterance. These so-called projectionist approaches view syntactical structures as the result of lexical conditions. The explanation of an utterance such as *Maria schlägt Peter* (Maria hits Peter) would be that the verb *schlagen* (to hit/to beat) requires two additional arguments. In this scenario, the valency of the verb determines the argument structure of the utterance (cf. Goldberg 1995: 11). Goldberg (1995) argues that a single verb can occur in numerous different argument structures, changing its meaning. The prototypical intransitive verb *schlagen* (to hit/to beat) cannot only be used transitively as seen above, but also in the following way: *Maria schlägt die Vase vom Tisch* (Maria hits/pushes the vase off the table). *Schlagen* (literally: to beat) is conceptualized as a process here, which effects the movement of an object. It is a meaning that cannot be found in the first example. To that end, a variety of analogue examples can be found in which verbs appear in utterances that do not pertain to their prototypical valency:

(1) *Maria schlägt die Vase vom Tisch* (literally: Maria hits the vase off the table).

Er hustet die Serviette vom Tisch (literally: He coughed the napkin off the table).

Peter zittert den Schaum vom Cappuccino (literally: Peter trembles the cream off the cappuccino).

Rex hechelt die Wurst vom Teller (literally*:* Rex pants the sausage off the plate).

Sie tritt den Ball auf die Wiese (literally: She kicks the ball onto the lawn).

A similarity is evident in the meanings of these statements, despite their use of very different verbs. As mentioned before, these examples encode the movement of an object via a process. Goldberg (1995) ascribes this phenomenon to a common argument structure, which underlies all utterances. Within Goldberg's approach, it is referred to as a **caused-motion construction**. This is a construction whose form [Subj V Obj Obl] is connected to the meaning [X CAUSES Y TO MOVE Z]. The actual meaning does not need to have much in common with the respective statements, even when the same verb appears in different phrase structures (in brackets). Stefanowitsch (2008: 248–249) illustrates how this is the case with the verb *rollen* (to roll):

(2) *Der Ball rollte*   (subject-predicate
      (literally: The ball rolled).   construction)

      Der Ball rollte unter den Tisch   (intransitive mo-
      (literally: The ball rolled under the table).   tion construction)

      Maria rollte den Ball unter den Tisch   (caused-motion
      (literally*:* Maria rolled the ball under the table).   construction)

      Josef rollte eine Wurst   (transitive
      (literally: Josef rolled a sausage).   construction)

      Kaspar rollte die Wurst rund.   (resultative
      (literally: Kaspar rolled the sausage round).   construction)

Example (2) shows that not only the verbs (by themselves) determine the argument structure of an utterance, but also the construction itself:

Even basic sentence patterns of a language can be understood to involve constructions. That is, the main verb can be understood to combine with an argument structure construction (e.g. transitive, intransitive, ditransitive, etc.). (Goldberg 2006: 6)

Goldberg's assumption is that syntactic structures always have underlying semantic content. For the English language, she has formulated the following list of argument structure constructions, which determine the basic message on the level of expression:

Construction	Semantic content	Form	Example
Ditransitive	X CAUSES Y to RECEIVE Z	Subj V Obj$_1$ Obj$_2$	*Pat faxed Bill the letter.*
Caused motion	X CAUSES Y to MOVE Z	Sub V Obj Obl	*Pat sneezed the napkin off the table.*
Resultative	X CAUSES Y to BECOME Z	Subj V Obj Xcomp	*She kissed him unconscious.*
Intransitive motion	X MOVES Y	Subj V Obj	*The fly buzzed into the room.*
Conative	X DIRECTS ACTION at Y	Subj V Obj$_{at}$	*Sam kicked at Bill.*

Table 4.2: Argument structure constructions of the English language according to Goldberg (1995: 3–4)

The difference between the concept of construction within construction grammar and de Saussure's concept of signs is clearly recognizable in the argument structure constructions of cognitive construction grammar. The caused-motion construction is a complex syntagmatic structure and, being a form-meaning paring, possesses underlying semantic content (X CAUSES Y to MOVE Z). It is important that the meaning is tied to an abstract construction and not to concrete lexical units alone. This aspect goes beyond de Saussure's concept of signs, as all linguistic levels are comprised of form-meaning pairings (cf. Koch 2019).

4.2.4   Construction Grammar Approaches

We now offer an overview of some approaches that currently exist within the framework of construction grammar. Basically, these can be divided into two areas (cf. Smirnova/Mortelmanns 2010: 135–136, Ziem/Lasch

2013: 38–66): cognitive, usage-based approaches and formal approaches. The handbook of construction grammar offers more detailed insights into the various theoretical approaches (Hoffmann/Trousdale 2013) (for a brief summary, see also Ungerer/Hartmann 2023).

4.2.4.1 Cognitive, Usage-Based Approaches

Cognitive construction grammar (CCxG), cognitive grammar (CG) and radical construction grammar (RCxG) can all be counted as cognitive, usage-based approaches. Lakoff (1987) developed the CCxG, a theory characterized primarily by the fact that it combines all linguistic structures into a single theoretical structure: the construction. Another feature of CCxG is that these structures are also psychologically plausible; cognitive construction grammar also considers the ideas of the cognitive sciences as well as the neural sciences to a great extent. Beginning in the 1990s, it was mainly Goldberg who significantly influenced the theoretical direction of the approach by publishing numerous works (significantly 1995, 2006, 2013, 2019). In comparison to earlier works by Lakoff, Fillmore, Kay and O'Connor, Goldberg's focus changed: peripheral grammatical phenomena or isolated phenomena such as the "there-construction" (Lakoff 1987) or the "let alone-construction" (Fillmore/Kay/O'Connor 1988) were no longer of interest. Instead, it was the core areas of traditional syntax (cf. Ziem/Lasch 2013: 40) in the form of argument structures that attracted Goldberg's attention. The thematic focus is on the acquisition of constructions and their mental representations. Experimental and neuroscientific procedures increasingly complement traditional corpus-linguistic methods as the methodological basis of investigations (Boyd/Goldberg 2011, Allen/Pereira/Botvinick/Goldberg 2012).

Cognitive grammar, along with construction grammar, is usually viewed as an independent theory. This is due to cognitive grammar developing relatively independently from other construction grammar approaches. Despite this, the cognitive grammar approach can be traced back to Langacker (1982, 1987, 1995, 2008a) and still shares decisive premises with Goldberg's cognitive construction grammar (Langacker 2005). Both theories propose a cognitive-semantic explanatory approach to describing syntactic structures and functions (cf. Ziem/Lasch 2013: 41). However, a major difference between the theories is the definition of the concept of construction itself. In contrast to Goldberg, Langacker differentiates between morpho-

logically and syntactically complex units, such as compounds, inflected words, or multi-word units, which have the status of a construction. In addition, non-complex linguistic units such as grammatical morphemes or lexemes ('simplizia') are referred to as symbolic units (cf. Ziem 2014: 28). A more expansive discussion of the differences between cognitive grammar and cognitive construction grammar is found in Goldberg's publications (2006) as well as Langacker's (2009). Both approaches have empirically lived up to the claim of an independent grammatical theory by recording and analyzing numerous different language phenomena.

Radical construction grammar goes back to the work of Croft (2001, 2013) and takes into account large parts of the assumptions of Langacker's cognitive grammar. However, radical construction grammar includes more typological and diachronic research in the formation of its theories than is the case for other cognitive, usage-based approaches. The approach can be considered radical in the sense that Croft questions the existence of syntactic functions such as subject or object. He views word classes such as noun, adjective, verb, and so on as building blocks of constructions rather than abstract, cross-linguistic categories. In this point, Croft agrees with Goldberg and Langacker, but his reasoning is mainly typological and diachrone. All three approaches share the conviction that language structures develop based on usage and are the result of language use.

4.2.4.2   Formal approaches

Formal approaches within construction grammar include the **Berkeley Construction Grammar** (BCxG), the **Sign-Based Construction Grammar** (SBCxG), as well as the **Fluid Construction Grammar** (FCxG) and the **Embodied Construction Grammar** (ECxG). All of these approaches are based (more or less) on distinct formalizations and resemble head-driven phrase structure grammars (HPSG) in their notation style.

In both fluid construction grammar and embodied construction grammar, this type of notation is used not only for illustration, as in the cognitive, usage-based approaches, but also for the systematic implementation of constructions in computational systems. The modeling of language processing is the main goal, rather than collecting and describing language knowledge (Bergen/Chang 2013, Steels 2013) and is inspired by actual language use. Both approaches are interdisciplinary in that they draw substantially on research in computer science, artificial intelligence research,

and robotics. So far, however, rather little work exists in this area, especially with respect to embodied construction grammar.

In contrast, Berkeley construction grammar and sign-based construction grammar are more rooted in the tradition of linguistic theories of grammar. In line with cognitive, usage-based approaches, construction was chosen as the unified representation format for linguistic units. A modularization of language knowledge (syntactic, semantic, morphological, and phonological knowledge), as proposed in approaches to generative grammar (see Section 4.1.3), is rejected. Nevertheless, generative rules are used to separate semantics from pragmatics. Linguistic redundancies at the mental level are rejected by Berkeley construction grammar, although they are accepted by, for example, cognitive construction grammar. This means that if concrete linguistic structures can be generalized, they are lost mentally in favor of abstract structures. The ditransitive construction is such an example. This construction is an argument structure with three semantic roles, an agent, a patient, and a recipient; they create the following schematic structure: $[[NP_{SUB}] [VP] [NP_{OBJ}] [NP_{OBJ}]]$. With the aid of a verb and three nominal phrases, the schematic structure can be realized in the shape of, for instance, *Maria gibt Peter ein Buch* (*Maria gives Peter a book*). In contrast to Berkeley construction grammar, cognitive construction grammar assumes that semi-specific forms of ditransitive constructions are also stored mentally. This is mainly based on frequency effects of linguistic structures. Accordingly, semi-specific forms such as the variant $[[NP_{NOM}]$ [*gives*] $[NP_{DAT}] [NP_{AKK}]]$ may be stored in the speaker's construct-i-con, since the ditransitive construction is prototypically used with the verb *give* (see Chapter 4.3).

4.2.5   Summary

- Construction grammar differs from other theories of language in its fundamentally different assumptions regarding the structure and organization of linguistic knowledge.

- Construction grammar is not (at least at present) a unified, monolithic theory. This can be seen in the differences between the individual research approaches. Nevertheless, these different approaches share the assumption that all linguistic structures can be captured in the format of construction.

- Constructions are always form-meaning pairs. This applies not only to words, but also to more complex grammatical structures. This results in a new understanding of the relationship between grammar and lexicon.
- We introduced argument structure constructions as a special construction type, which is able to illustrate this aspect. Goldberg was able to break up the rigid division between grammar and lexicon with this new type of construction, by showing that a certain semantic content is always inherent to argument structure constructions.

4.2.6 Review Questions

1. Name and explain five central premises of construction grammar approaches.
2. Explain how the concept of construction differs from de Saussure's concept of signs.
3. Explain the main idea of argument structure constructions. Why is this perspective on language different from other concepts?
4. Explain the notion of three dimensions of linguistic knowledge within usage-based, cognitive approaches using examples.

4.3 Construction Grammar – Conceptualization and Mental Representation

Katharina Günther

Now that we have introduced the concept of construction along with theory of various approaches within construction grammar, this chapter will focus on the organization of language on a conceptual level. This means that we will discuss the mental representation of constructions and how constructions are learned, stored, and used.

All approaches of construction grammar (CxG) assume that all linguistic expressions and their underlying conceptualized knowledge can be represented in one and the same format: constructions. In contrast to generative grammar, construction grammar does not differentiate between deep structure and surface structure (see Chapter 4.1). Language knowledge, for instance the knowledge of constructions and their use, is depicted in a network of constructions: the constructicon. This term was created using the word construction and lexicon and refers to the continuum of lexicon (meaning) and grammar (form). In the following chapter, we address the questions of how mental representations of constructions actually emerge and how a network develops between them. You will learn in the following sections which processes produce construction through their usage, what information on constructions is mentally stored, as well as about the links between constructions. In the last part, we will offer an insight into the special conceptualization of constructions in bilingual speakers, in order to answer the question of how multi-language constructions are represented in the constructicon.

Study Goals

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

- develop an understanding of the mental representations of constructions
- understand the way constructions are stored
- explain the links between constructions within the constructicon
- describe and analyze the case of bilingual speakers.

4.3.1 The Conceptualization of Constructions from a Cognitive, Usage-Based Perspective

So, how are constructions processed, stored, and conceptualized or networked in the constructicon? How do they emerge in the first place? According to proponents of cognitive, usage-based approaches, constructions result from language usage, which is why the approaches are called usage-based (cf. Langacker 1987, Goldberg 1995, Croft 2001). They view language, or rather grammar, as a dynamic system that is constantly changing due to its dependency on cognitive processes. Various phenomena play a role in this dynamic development. We will describe the role of frequency in the development and entrenchment of constructions in the constructicon. Afterwards, we will detail what information the respective mental representations contain on constructions. We should note at this point that CxG is merely one possible approach to explaining the mental representation of language. As the existence of mental structures and their development cannot be verified, we must emphasize that these approaches are purely theoretical.

4.3.1.1 Development and Consolidation of Constructions as Mental Representations

This section deals with the question of how constructions are represented mentally. Which processes contribute to speakers storing constructions on a conceptual level on the basis of language use? Or, simply said, how does a speaker learn them?

Entrenchment plays an important part. On the one hand, the term 'entrenchment' includes diverse processes which contribute to the consolidation of mental representations and lead to various degrees of entrenchment. These processes, according to Schmid (2014: 3) include "memory consolidation, chunking and automatization". On the other hand, entrenchment also refers to the results of these processes, so-called "entrenched linguistic structures" (cf. Langacker 2005: 105, Schmid 2014: 3). All of the constructions that appear in the speakers' use of language are included in the constructicon, a kind of lexicon of all constructions. There, they are stored and consolidated and then considered entrenched. Constructions that appear frequently are more entrenched than less frequent constructions. The process of becoming more entrenched is directly tied to the frequency with which the construction is used. Researchers hereby distinguish between

type frequency and token frequency. In order to explain the difference between type and token in linguistics, consider the following brief example:

(1) *A girl goes to the supermarket and buys an apple and a banana while another girl waits outside.*

Every single occurrence of an element or linguistic utterance counts as a **token**. Hence, our example sentence contains 18 tokens. **Type** is a class which all words which share a common, underlying abstract unit belong to (cf. Bußmann 1996: 812). If we were to define the category word form as a type, our sentence has 16 types. *Girl* appears twice in our example and, therefore, to the same type, as it is the same word. The category, or the type, does not necessarily correspond to word class as in our example. If we defined nominal phrases as types, all nouns of our example sentence would be considered to be one type. The phrases *a girl* and *an apple* would belong to the same type, for instance.

Now, let us return to constructions; in the example, we considered words as individual tokens. Similar to tokens, idioms are a phenomenon that have engaged construction grammar from the very beginning. Idioms are combinations of words that, as a whole, yield a specific sense that cannot be deduced from the individual meanings of the words. A high token frequency means that a single construction appears frequently and unchanged as a token, as for examples the idioms *break a leg* and *once in a blue moon*. Idioms cannot be abstracted any further, as their information content in form and meaning is unique. A high token frequency results in idioms being stored as a unit: they become entrenched. These types of constructions cannot be abstracted any further and every element is set lexically. They are referred to as specific constructions.

In English, other frequently occurring constructions are constructions such as *the -er, the -er*. These constructions are called **partially-schematic constructions** as one part of the construction is lexically specified and the other part is schematic. Partially-schematic means that the construction is partially stored with lexical material, in this case *the -er, the -er*, which still allows for variations in certain places (see Chapter 4.2). Numerous possibilities come to mind for the aforementioned example of *the -er, the -er*: *the richer they are, the lonelier they get; the harder you practice, the better the result*.

If specific and partially-schematic constructions appear frequently in input, it means that the token frequency is high. This in turn means that speakers

will be storing a mental representation of this specific construction. As we have already noted, constructions cannot be abstracted any further.

A high occurrence of utterances which correspond to one type of construction equals a high type frequency. A high type frequency leads to the development and storage of abstract, schematic mental representations (also called schemas). Schemas are units that come into existence via the structural and functional similarities of many linguistic utterances (cf. Ziem 2014: 22).

A classic example of a schema is the caused-motion construction. Caused motion is the phenomenon of a person or object being moved physically through the influence of another person or object. Figure 4.3 below shows several examples of utterances that contain caused-motion constructions. Different linguistic elements can be inserted into a caused-motion construction. Every time this is done, different instances of constructions are created (cf. Ziem/Lasch 2013: 197). These instances are similar structurally: they all have a subject, a verb, an object, and a directional phrase. These common features make it possible to mentally create a schematic construction or mental schemas, through abstraction processes. This is especially the case when the construction appears frequently in input. Every time a speaker encounters this structure in everyday language use, the mental representation is reinforced.

Schema, abstract construction

[Subject] [Verb] [Object] [Dir. Phrase]
caused motion

| Lisa puts the glas on the table. | Paul shot the ball into the goal. | She builds the pieces on each other. | ... |
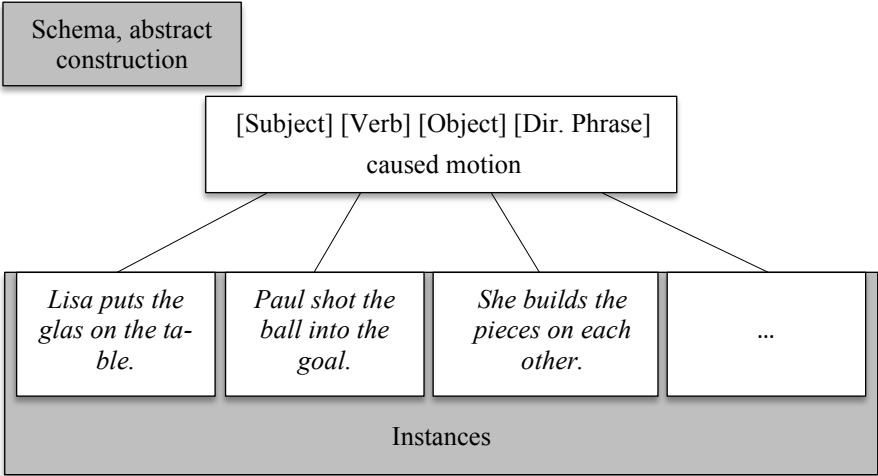
Instances

Figure 4.3: Interplay of different utterances (instances) and abstract mental representations (schemas) (own illustration)

Figure 4.4 illustrates how a high token frequency as well as a high type frequency can lead to the formation of mental representations. This means that the frequent occurrence of linguistic input of the same kind can lead to more or less abstract mental representations. On the left-hand side a schematic construction with a high type frequency is pictured, i.e. it exhibits a high number of instances of structural and functional similarity. On the right-hand side, a single, highly frequent token is depicted which cannot be abstracted any further; it always appears in the same shape and is, therefore, an entrenched construction.
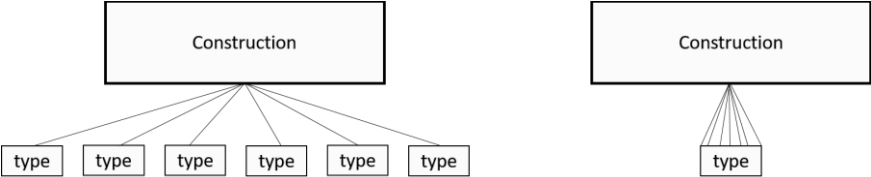
Figure 4.4: Entrenched schematic construction (left) versus entrenched tokens (right) according to Barðdal (2001: 32)

Productivity is relevant to the formation of the mental representations of constructions or conceptualizations. Productivity captures to what extent the non-lexicalized slots in a construction can be filled. A construction is only productive when many lexical elements can be inserted into its slots. The argument structure construction known to us as caused motion (compare Figure 4.3) is very productive, because numerous lexical elements can be inserted. The verb ending *-ed*, which marks the past tense in the English language, is another example of a very productive construction and appears alongside many verbs (*walked, danced, talked*). The ending for irregular verbs [-ʌŋg/k] (*sang, rung*) (Bybee 1995) is far less productive because it is used for fewer verbs. Productivity is considered a sufficient indicator of the degree of entrenchment of a construction, but not a necessary criterion, because low productivity does not necessarily go hand in hand with low entrenchment (Ziem 2014: 21). The construction [-ʌŋg/k] may be less productive, but due to its high token frequency it is just as strongly entrenched as the verb ending *-ed* (Verbs such as *sang, rung* are also very common in language use).

4.3.1.2 Storage Forms: Instances and Schemas

Some proponents of construction grammar assume that high type or token frequency results in both item-specific knowledge (specific constructions) and abstract constructions (schemas) are stored in the constructicon (cf. Goldberg 2006, 2009).

Several empirical studies challenge this view. A number of different opinions can be found in literature on the topic of if, and to what extent, speakers create abstractions and generalizations and store them as schemas (cf. Barðdal 2008: 45; also cf. Croft 2001: 51-53).

Empirical studies show that speakers might not be storing abstract schematic knowledge at all. Instead, they might be storing and using a large number of concrete instances stored as specific constructions (Bybee 2010; also cf. Hilpert 2014: 66). Concrete utterances that are highly frequent are deeply entrenched and can be easily accessed without having to fall back on a schema. We also speak of **lexical prefabs** in this case, which are prefabricated word rows. These are highly frequent and are processed and retrieved as a whole. An example would be *what's up?* (cf. Diessel 2016: 212, Wray/Perkins 2000: 1).

Also, the use of schemas places high demands on the speaker in terms of processing. The speaker needs to make quick decisions when producing language and choose which element he or she should insert into a schema (cf. Diessel 2004: 21). Schemas are therefore viewed as secondary, as "serving more of an organizing function than an active computational one" (Langacker 1991: 265). They are only activated when a concrete instance is not available when the speaker intends to produce a new and less frequent utterance (cf. Diessel 2004: 23, Dąbrowska 2010).

However, according to Boas, the knowledge of schemas alone is not sufficient for two reasons: for one, the speakers who only rely on abstract schemas lack verb information needed for producing a construction. Even though the verbs *talk* and *spea*k are commonly viewed as synonyms, it is evident in the following example (2) that only the verb *talk* can be inserted, not *speak*.

(2) *Miriam talked herself blue in the face*.
   **Miriam spoke herself blue in the face*.

(Boas 2003: 106)

Secondly, not all verbs accept the same categories of postverbal constituents, as we will see in the following examples. The examples (3) and (4) are resultative constructions. The verb *dance* necessitates the insertion of *to + nominal phrase* in this case, the verb *talk* does not. This is information that is not contained in the schemas, but which depends on the verb itself. Consequently, speakers must store knowledge on specific instances. They must know under which circumstances a verb can be used in a certain construction in order to produce the correct expression.

(3) *Jerry danced himself to exhaustion* versus **Jerry danced himself exhausted.*

(4) **Nancy talked herself to hoarseness* versus *Nancy talked herself hoarse.*

<div align="right">(Boas 2005: 449)</div>

Lastly, we must mention that speakers need abstract schemas for the production of new utterances (Langacker 2000, Diessel 2004). For instance, when we use a new verb in English and form a past tense with it, we base it on an abstract construction, the schema *-ed*. There is a close correlation between productivity and entrenchment (see Section 4.3.1.1): as the schema *-ed* is both more productive and more entrenched than [-ʌŋg/k], it is more likely to be used (cf. Diessel 2004: 31).

4.3.1.3   Levels of Storage

Even though the very existence of schemas and their use is disputed, researchers have conjectured a hierarchy of superordinate and subordinate constructions (also see Section 4.3.1.5). Superordinate constructions are more abstract constructions such as [[Subject] [Verb] [Object] [Directional Phrase]] for caused-motion constructions (Figure 4.3) or [Verb + Ending -ed] (Figure 4.5) for instance.
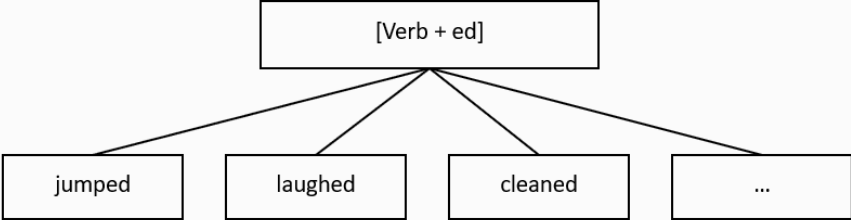
Figure 4.5: Superordinate past construction and its instances (own illustration)

Advocates of formal and cognitive, usage-based approaches have different opinions regarding what level information on constructions is stored (see 4.3.1.4), or how often the information is stored. Kay & Fillmore (1999; Berkeley construction grammar) assume that information is only stored once in a superordinate construction and is not stored repeatedly in subordinate constructions. Redundancies are, therefore, avoided. An example is the superordinate Simple Past tense construction: verbs end with -*ed* (cf. Hilpert 2014: 66 for German). The knowledge of the schemas or the superordinate construction is sufficient for the speaker to apply the ending productively to verbs. The subordinate constructions are merely instances of *jumped* and *cleaned*, which need not be stored individually, as they arise from the schemas. This solution is economical, as information is only stored once. Usage-based, cognitive theories (Croft 2001, Goldberg 1995) tread a different path. They assume the existence of redundant representations because they are psychologically more plausible. As described in 4.3.1.2, we can assume that speakers probably are oriented towards linguistic instances rather than towards abstract schemas – as long as they appear with sufficient frequency. Speakers refer back to the schemas when they encounter a rare verb whose concrete instance is not frequent enough to have a high level of entrenchment. In conclusion, information is not solely stored in superordinate schemas; they must contain concrete instances as well.

4.3.1.4   Inheritance Links between Constructions

What would our stored language knowledge look like? What shape would it take? How are constructions – be they abstract or specific – connected with each other in the constructicon?

In the constructicon, constructions form a network-type structured inventory of the knowledge that a speaker possesses on language conventions (cf. Langacker 1987: 63). As we have seen, the construction network is structured taxonomically, meaning that a hierarchy exists in terms of the degree of abstraction in constructions. There is more than merely a hierarchical arrangement between constructions: relations also exist between constructions with the same degree of abstractness (cf. Ziem/Lasch 2013: 96). The relations between constructions are motivated. It means that construction A can be conjectured partially or completely from construction B. B, in consequence, motivates A. This specific construction inherits the

formal and functional features of the superordinate, more abstract con-
struction (Hilpert 2014: 60).

```
[Verbalphrase]
     |
  [Verb Obj]
     |
   [eat Obj]
     |
 [eat [pasta]]
```
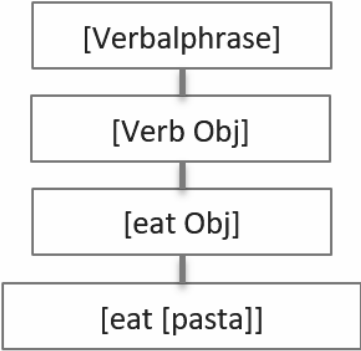
Figure 4.6: Different levels of taxonomical hierarchies (inspired by Croft/Cruse
2004: 263)

The proponents of the various currents have different opinions on the sub-
ject of the types of inheritance links between constructions. Signe-based
construction grammar (SBCxG) and Berkeley construction grammar
(BCxG) conjecture a full inheritance link between constructions (cf.
Kay/Fillmore 1999). According to this approach, either a construction
passes on all of its features to a filial construction, or none at all. In oppo-
sition, Goldberg (1995) and Langacker (1987) argue that a construction
can inherit individual pieces of information on form and meaning from
several superordinate constructions: for instance, the construction *I didn´t
sleep* inherits features from the construction [Subject Verb$_{\text{INTRANSITIVE}}$] as
well as from the construction [Subject Auxiliary-n't Verb] (Croft/Cruse
2004: 264). The next section will present models for structuring form and
content of the constructicon, for example [NP$_{\text{NOM}}$].

4.3.1.5   Taxonomical Hierarchies

Croft describes taxonomical relations between constructions (Croft/Cruse
2004: 262). Every construction with unique morphological, syntactical,
lexical, semantic, or discourse-pragmatic features constitutes a so-called
node (Croft 2001: 25).

Let us consider the example of the idiomatic construction presented in Figure 4.7, *He hits the bar*. Even though this idiomatic construction possesses its own node due to having its own meaning, there are still connections to other constructions. The more schematic verb-specific construction [Subj. *hit* Object] constitutes a superordinate node. The completely schematic construction [Subj. Verb Object] stands above this node. The degree of abstractness and schematicity increases: every subordinate construction represents an instance of the more schematic construction (also see Figure 4.7). We can conclude that the superordinate construction passes down information on form to the subordinate construction and that constructions can inherit information from several schematic constructions.
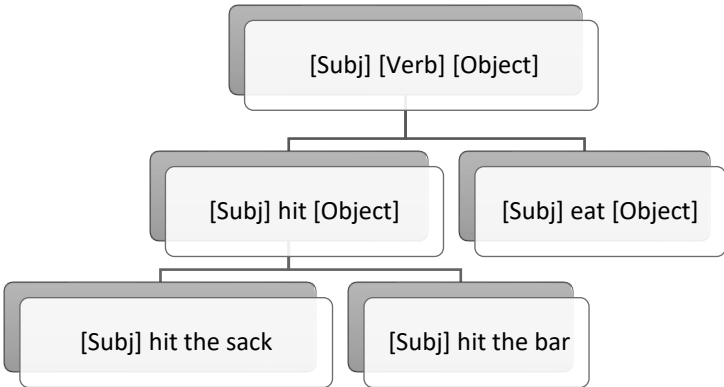
Figure 4.7: Illustration of taxonomical inheritance links inspired by Croft (2001: 26)

4.3.1.6   Inheritance Links – What Types Exist between Constructions?

Goldberg (1995: 74-76) proposes a detailed model for structuring the constructicon. She postulates four types of inheritance links between argument structure constructions, which we will present in the following section.

Polysemy Links

Using the ditransitive construction and the caused-motion construction as examples, Goldberg (1995) illustrated how some constructions are connected by polysemy. The central, prototypical meaning of the ditransitive

construction is the transfer of an object from Z to Y. Lexicalized elements, in this case the verb, can expand the meaning of the construction. Table 4.3 presents different possible meanings of the ditransitive construction. The prototypical construction passes on the semantic basic meaning as well as the syntactical information to the polysemous constructions.

Meaning	Examples
X CAUSES Y TO RECEIVE Z	*Paul gave Mary the flower.*
X CAUSES THAT Y RECEIVES Z – condition of satisfaction	*Paul promised Mary a wonderful marriage.*
X ENABLES Y TO RECEIVE Z	*The bank allowed him a credit.*
X CAUSES THAT Y DOES NOT RECEIVE Z	*The police revoked him his driving license.*
X INTENDS TO CAUSE Y TO RECEIVE Z	*Paul built Mary a house.*

Table 4.3: Polysemy of the ditransitive construction (inspired by Ziem/Lasch 2013: 99, Goldberg 1995: 75)

Subpart Links

When construction A is part of construction B but is also capable of existing independently from construction B, it is setting which Goldberg calls a subpart link. A relation like this one exists between a resultative and an intransitive construction (for instance Example (5)) as well as between an intransitive-motion construction and a caused-motion construction (for instance Example (6)). To elucidate the process, the inherited information is underlined in the examples (5) and (6). It corresponds with the nominal, verbal, and prepositional phrases. We can conclude from this example that every complex syntactical construction maintains subpart links to additional, simpler constructions. Argument structure constructions, for instance, always include nominal phrase constructions as well as verbal phrase constructions.

(5) A*: Paul runs.* (intransitive)
     B*: Paul runs* over a cat. (resultative)

(6) A: *Paul drives to the supermarket*. (intransitive motion)
    B: *Paul drives Lisa to the supermarket*. (caused motion)

Instance Links

Instance links exist between two constructions when one of the constructions is a particular case of the other. In this case, construction A is a "more fully specified version" (Goldberg 1995: 79) of construction B. This is often the case for idiomatic expressions. Example (7) presents a resultative construction. The resultative construction's semantic and syntactic information is passed on to the instance. It is only in this specific resultative construction that a lexical element, in this example the verb drive, in combination with *mad* receives a certain meaning (here, 'crazy').

(7) *The students drive the teacher mad.* (instance of a resultative construction)

Metaphorical Extension Links

Goldberg illustrates how the content of a construction is extended with a metaphorical extension link by expanding the resultative construction into a caused-motion construction.

Examples (8) and (9) describe certain goals: the caused-motion construction encodes the prepositional phrase *into the bowl* with a specific goal: the activity changes the locality. The resultative construction *into pieces* does not name a specific goal, yet describes metaphorically how the state is changed by the activity (from a whole apple to small pieces).

According to Goldberg (1995: 81), the metaphoric extension is grasped in the form of a "change of state as change of location" (Goldberg 1995: 89). The meaning of the resultative construction in Example (9) is the direct result of the metaphoric extension of the caused-motion construction, which is regarded as dominant.

(8) *Paul cuts the apple into the bowl.*
    (caused motion)

(9) *Paul cuts the apple into pieces*.
    (resultative)

Metaphoric extension
location → state

4.3.2 Conceptualization of Constructions in Multilingual Contexts

Research in the field of construction grammar has mainly focused on monolingual language use and has dealt primarily with the English language. In the 90s, scholars began to increasingly devote themselves to other languages as well. The basics that had been established up to that point for English were applied to other languages (for an overview, see Boas 2010: 4). Applying the construction grammar approach to any language is effortless (Fried/Östman 2004). Scholars then turned to the question of how they may apply their knowledge of language and constructions to multilinguals. Over the course of this chapter, we will gain insights into the basics of construction grammar perceived in a multilingual context.

4.3.2.1 Language-Specific Constructions

The first question to be asked when studying various languages and their underlying constructions, is whether different languages have different constructions or whether cross-linguistic constructions exist. Hence, it is a question of the language-specificity of constructions. The various currents of construction grammar take different positions in this regard. Kay & Fillmore (1991: 1) assume a set of cross-linguistic, abstract constructions which pass on their features to other language-specific constructions (ibid: 19). Croft (2001) and Goldberg (2013), on the other hand, are of the opinion that constructions are fundamentally language-specific. While cross-linguistic phenomena are not rejected as such, Goldberg (2013: 25) claims that these can be explained by cognitive processes.

There are more questions than answers regarding this aspect as of now. If we assume that constructions are language-specific, we must wonder what the structure of a bilingual's constructicon may look like. Perhaps it would look something like this:

- Is it plausible for bilinguals to possess a separate constructicon for each of their languages?

- The research of bilingualism does not assume the existence of strictly separated language systems. The notion of a network, in which both languages are connected, is the dominant idea (Paradis 2004, de Bot 2004, Riehl 2014). Based on this assumption, can we conclude that constructica are connected with each other and capable of interaction?

Language A — Language B

- Or is it possible that bilinguals develop cross-linguistic constructicons i.e. superordinate constructions not specific to a language? That would make it possible for information and form to be stored only once for all languages together. This is an idea that is pursued by Höder (2012, 2014): the structurally and functionally similar constructions of two languages forms a cross-linguistic diaconstruction (Höder 2012: 247-249) connected by a diasystematic link.

cross-linguistic construction

Language A   Language B
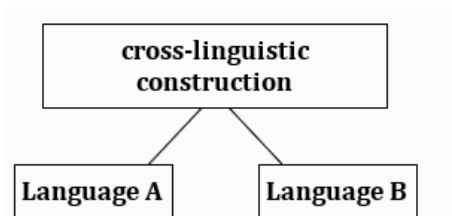
If there are constructions that are identical in two languages, we can assume that speakers use these constructions more frequently. Because they appear in two languages, they have a high frequency and are, therefore, more entrenched. It does not answer the question whether a cross-linguistic construction develops from identical constructions in two languages, but it could be evidence of the interaction of the two constructica. They may not be wholly separate. Wasserscheidt (2014) assumes that bilingual speakers do not develop cross-linguistic constructions, but solely create semantic generalizations. The form of the construction is specific to the respective language.

4.3.2.2   Bilingual Phenomena

In this last section we seek to explain cross-linguistic influences with the aid of construction grammar. Cross-linguistic influences are "the influence of a person's knowledge of one language on that person's knowledge or use of another language" (Jarvis/Pavlenko 2008: 1). In view of the interplay of languages, we must ask how constructions interact cross-linguistically. According to Wasserscheidt (2015: 251-253), we should challenge the use of the term 'transfer'. His reasoning is that a solely syntactical or semantic transfer cannot occur because construction grammar does not conjecture a separation of form and meaning. In place of transfers Wasserscheidt (2015: 161-163) speaks of cross-references ('Querverweise' in German), meaning to say "that [the speaker] refers to symbols in the language LB [Language B] in a certain way when producing forms in LA [Language A]" (translated from Wasserscheidt 2015: 161-163). The speaker can refer to and access different elements of construction within Language B. Wasserscheidt (2015) describes four strategies of this process, two of which we will elaborate on: **insertion** and **imitation**.

We can observe with bilingual language production that the meaning as well as the form of a lexeme belonging to Language B can be inserted into a slot in a construction of Language A (compare Example 10). Wasserscheidt calls this strategy insertion; the speaker hereby refers to the construction as a whole (Wasserscheidt 2015: 161).

(10)   *Can you give me the Brot?*

An additional form of cross-linguistic influence according to Wasserscheidt (2015) is the imitation of a construction that belongs to another language. The influence of the L2 is evident without the morphemes being realized in the second language. The speaker refers solely to the semantic structure of the other language's construction. An example of an instance of such an imitation is *playing the piano*: in Turkish *piyano calmak* (literally: piano to.sound) and in Dutch *piano spelen* (literally: piano to.play) (inspired by Backus/Dorleijn 2010: 77). The concept is the same in both languages ('to produce music with an instrument or to master an instrument'). However, the meaning of the semantic components of the construction is different (to.play and to.sound). This leads to the phonological structure [X spelen] in Dutch and [X çalmak] in Turkish. If a speaker of Turkish and Dutch would say *piano oynamak* (literally: piano to.play) in Turkish,

he implements the meaning of the language A with the form and phonological structure of language B.

Wasserscheidt (2014) emphasizes that cross-linguistic phenomena do not consist in transfer of constructions from one language to another. They can be explained with cognitive strategies, such as when a speaker imitates part of the semantic structure of a construction.

More experiments and corpus work are necessary to investigate to what extent the structure of constructica or constructicons in bilinguals can be inferred from cross-linguistic transfers.

4.3.3 Summary

- Constructions are reinforced on a conceptual level via generalizations and abstraction processes.
- Frequency of occurrence (type and token frequency) and productivity play an important role.
- Item-specific knowledge as well as abstract schemas are stored in the constructicon. A speaker usually relies more on item-specific knowledge when processing.
- Constructions are stored in a pattern in the constructicon.
- Constructions are connected by inheritance links, in which superordinate constructions pass on information to subordinate constructions. There is no consensus on the type of inheritance link (be it full or partial).
- Goldberg defines the following inheritance links between argument structure constructions: polysemy links, subpart links, instance links and metaphorical extension links.
- There are few research insights on the nature of constructions in bilinguals. Scholars assume that bilinguals create abstractions in the same fashion that monolinguals do. It is however unlikely that multilinguals are capable of cross-linguistic constructions, at least on the level of form.
- In construction grammar, cross-linguistic influences can be explained by the processes of insertion and imitation.

4.3.4   Review Questions

1.   What is the constructicon and how is it structured?

2.   Abstract schemas or concrete instances: which are more likely to be used for language processing?

3.   What types of inheritance links does Goldberg describe as existing between constructions?

4.   Think of an example of an argument structure construction that is identical in German and a language of your choice.

5 Linguistic Diversity, Relativity, and Cognitive Linguistics

In this chapter, we acquaint ourselves with linguistic diversity and its relation to cognitive linguistics. We specifically look at the extent to which languages differ in the expression of meaning. Cognitive linguistics departs from the assumption that language is based in general cognitive mechanisms of human beings. From such a point of view, we would expect that languages are similar. In 5.1, we investigate the diversity of the world's languages. We do so by turning specifically to a few domains of human experience, such as SPACE, MOTION, and BODY PARTS. In so doing, we find that languages do indeed differ in how meaning is expressed and what meaning that can be expressed.

On the basis of the systematical differences between languages to be discussed in 5.1, we turn in 5.2 to the proposal that linguistic differences correlate with differences in thought. This is the controversial notion of linguistic relativity. We summarize this claim and discuss both arguments for and against.

In 5.3, we explore the implications of linguistic diversity for cognitive linguistics. Specifically, we ask whether linguistic diversity can be accounted for and explained from a cognitive point of view. This leads us to interrogating whether there are so-called linguistic universals: exceptionless patterns across languages.

5.1 Linguistic Diversity

Johan Blomberg

How languages differ in the expression of meaning is a question for **semantic typology**. It is concerned with the expression of particular domains of experience, such as SPACE and TIME. Semantic typology explores and describes linguistic variation in such domains by pointing to wherein differences in describing the world reside. Where possible, semantic typology presents constraints on language types based on empirical observation. In this chapter, we explore semantic typology. Chapter 5.1 introduces some interesting cases of diversity in meaning across languages, including diversity in basic domains such as SPACE and MOTION. In Chapter 5.2, we discuss the tools and methods for investigating semantic diversity. The chapter ends in 5.3 with a summary and conclusion.

Study Goals

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

- account for a few examples of linguistic diversity
- know the difference between lexical and grammatical diversity
- describe the basic features of semantic typology
- know the difference between a universalist and a relativist view of linguistic diversity.

5.1.1 Semantic Variation across Languages

What type of variation is there between languages? Languages differ for instance in their sound inventory, in pronunciation, and in orthography. Here, we are not interested in such difference, but concerned with investigations of the possible variation in meaning across languages. Somewhat roughly, languages can differ in two ways:

- What meanings can be expressed?
- How are the same meanings expressed?

With respect to the first type of differences, there are many examples of 'untranslatable' words. As we saw in Chapter 1, the Japanese word *tsun-doku* means 'the act of leaving a book unread after buying it, typically piling it up together with other such unread books'. Czech has the word *pro-zvonit* for calling a mobile phone and letting it ring once so that the other would call back up, which allows the original caller to not spend money on minutes.

There are many examples of such individual words difficult or even impossible to directly translate into a word in other languages. While these differences are interesting in themselves, research in semantic diversity has been more interested in systematic differences across language. One domain in which researchers tried to find systematic differences is the domain of the HUMAN BODY and how its different parts are referred to in different languages. One example is body part terms in the Mon-Khmer language Jahai, which lacks words corresponding to the English words *arm*, *leg*, and *limb* (Burenhult 2006). Instead, speakers of Jahai refer to those body parts with a term that does not differentiate between extremities (cf. 5.1.4). Kinship terms have been another domain for the investigation of cross-linguistic differences. The Tangkic language Kayardild uses an intricate system, combining information about the speaker and the sibling referred to, such as their relative age and whether they have the same or opposite sex. The system is shown in Figure 5.1.
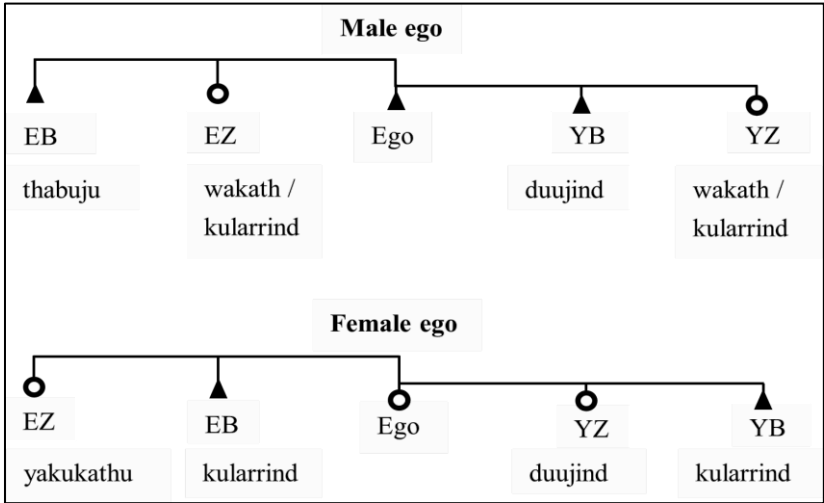
Figure 5.1: Kinship terms in Kayardild (adopted from Evans 1985: 484)

For instance, when a female speaker refers to a younger sibling of the same sex, she would use *yakukathu*. The Kayardild word expresses a specific meaning not easily translatable to English, and, therefore, expressing a sense not directly lexicalized by the English terms *brother* and *sister* which only takes the gender of the sibling into account. In contrast, *yakukathu* lexicalizes information like 'older sibling of the same sex, said by a female person'.

How can the same sense be expressed differently? A simple example is, when one language has one word where another has two. Consider once again kinship terms, but now for grandparents. The English word *grand-mother* does not differentiate between a maternal grandparent on the father's or the mother's side. In contrast, the Swedish words *mormor* and *farmor* indicate which of the parents' side the grandmother belongs to. Thus, the English word is semantically general with respect to parents' side whereas Swedish makes a distinction and requires in this regard semantically more specific information.

The examples we have encountered concern **lexical diversity**: similarities and differences in semantic fields like color, kindship, and body parts. But languages can also differ in what is obligatorily expressed through grammar and linguistic structure, **grammatical diversity**. One example is that some languages grammatically mark the nature of the evidence for a given statement. This is known as **evidentiality**. Most commonly, languages with evidentiality differentiate between two different evidential markers, such as witnessed vs. non-witnessed or reported vs. everything else. This is the case in for instance Turkish where the difference between witnessed and non-witnessed is marked with inflections on the verb, as in (1a) and (1b) below. In (1a), the statement is reported indirectly, and can thus be hearsay or otherwise indirectly known. (1b) states that the speaker knows the state-of-affairs directly, for instance by having heard it directly from Ahmet or his wife.

(1) a. *Duydun mu, Ahmet ile karısı boşan**mış**?*
         (Did you hear that Ahmet and his wife are divorced?)

     b. *Duydun mu Ahmet ile karısı boşan**dı**?*
         (Did you hear that Ahmet and his wife are divorced?)

The type of evidentiality in Turkish only marks whether there exists a given source of information, but does not specify the source of information further. Other languages exhibit systems with different evidential markers

indicating what the source is explicitly. This is the case in New Guinean language Fasu which differentiates between the following six types of evidentials: visual sensory, nonvisual sensory, inferential, reported, heard from known source, direct participation. While English does not grammatically express evidentiality, it can nevertheless be lexically expressed by the choice of verb. Whereas (2) expresses a statement, (3)-(5) also involves the type of evidence the speaker puts forth for the statement in question.

(2) *Danilo is tired.*

(3) *Danilo looks tired.*

(4) *Danilo seems tired.*

(5) *Danilo would be tired by now.*

It is primarily such structural properties in obligatory information that have been the target for typological concerns. In the following, we look closer at three interesting examples of semantic diversity.

5.1.2   Spatial Frames of Reference

Given universal properties of physical nature and human constitution, it would be reasonable to assume that languages across the world would treat spatial relations fairly similarly. It has for instance been claimed that viewpoint-relative locutions such as *left* and *right* would be primary in cognitive development, and by extension reflected as the basic way to locate entities in the space across the languages of the world.

This assumption has been challenged on grounds of cross-linguistic research on spatial relations. Languages spoken in various parts of the worlds, such as Tzeltal, Dene, Arrernte, and Guugu Yumuthirr prefer to specify spatial relations at different scales, in terms that are similar to cardinal directions such as *west* and *south* (Levinson & Wilkins 2006). Some languages even lack words for viewpoint-relative specifications. It is of course possible to use cardinal directions in many languages, but this use is typically restricted to large-scale geographical specifications, such as *Munich is south of Berlin*. This is illustrated in Figure 5.2 where a small-scale spatial situation is expressed in terms of absolute bearings, together with an example description of this situation in Tzeltal.
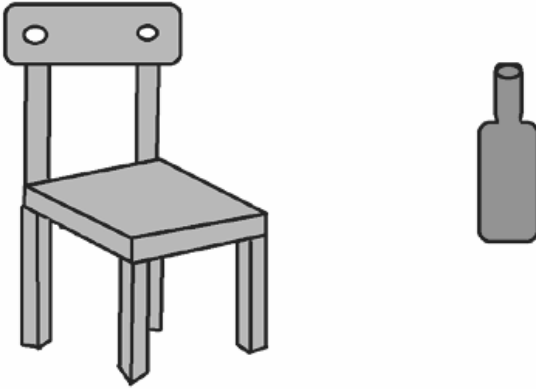
Figure 5.2: Stimuli representing a spatial relation possible to describe with different spatial frames of reference (Katsiaryna EL-Bouz)

waxal	*ta*	*y-ajk'ol*	*xila*	*te*	*limite.*
stand-of-vertical-cylinder	at	its-uphill	chair	the	bottle

(The bottle is standing uphill of the chair.)

(Levinson 2003: 148)

To either use viewpoint-relative or absolute bearings are two fundamentally different ways to describe spatial relations (or different construals of space). They are stable frameworks for gauging relations between entities in space, what has been called **frame of reference** (see Levinson 2003). A speaker viewpoint-based frame of reference is called **relative** (the left-right distinction), and one based in cardinal directions (the north-south distinction) is called **absolute**. Apart from these two types of frames of reference, it is also possible to specify spatial relations in terms of properties of one of the two entities, such as *in front*, *at the backside* etc. This is known as the **intrinsic** frame of reference. Taken together, this gives three different ways to designate the relation between two different objects. These three different frames of reference can be seen to differ in the perspective on space (see Figure 5.3):

(6) *The man is in front of the house.*   [intrinsic]

(7) *The man is to the left of the house.*   [relative]

(8) *The man is to the north of the house.*   [absolute]
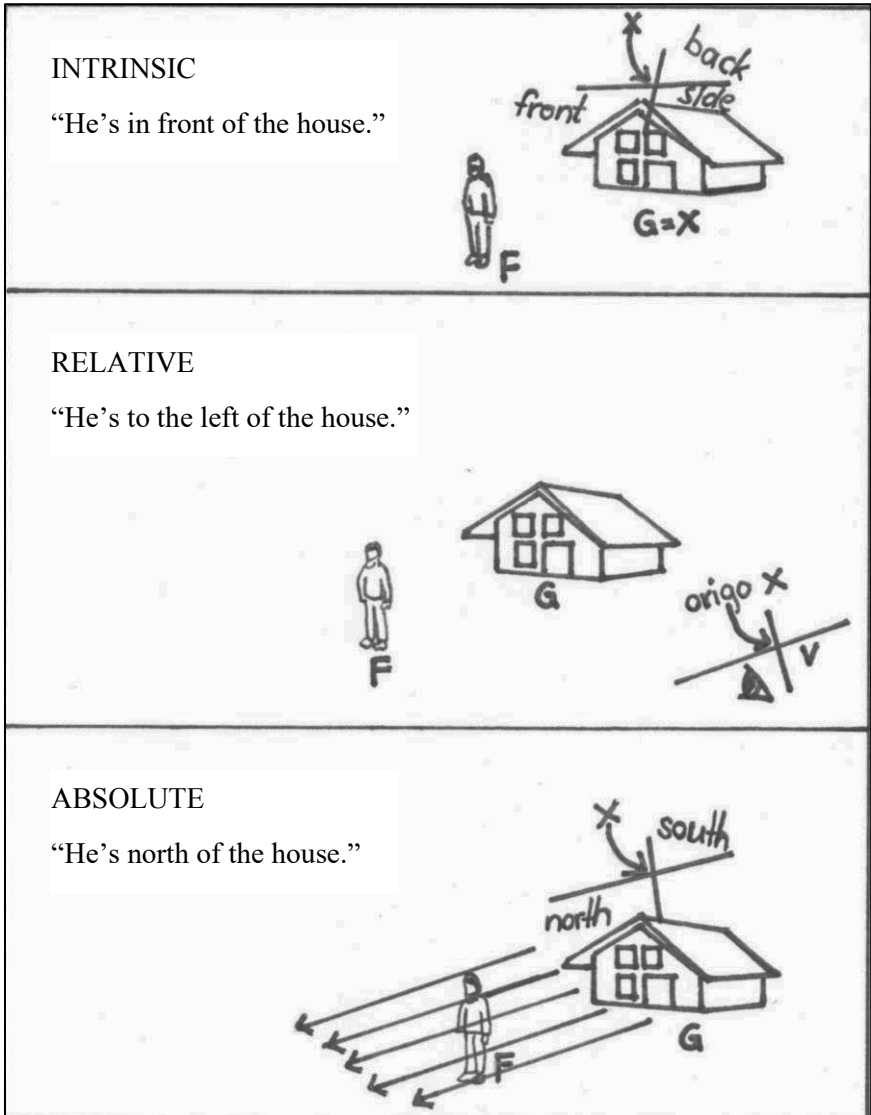
INTRINSIC

"He's in front of the house."

RELATIVE

"He's to the left of the house."

ABSOLUTE

"He's north of the house."

Figure 5.3: Illustration of the three different spatial frames of reference (adopted from Levinson 2003: 40)

The three frames of reference can be defined in terms of logical properties. These include the number of elements specified in a statement and whether

conversing the expression pertains to the same state-of-affairs. The intrinsic and absolute frames of reference express binary relations between an entity and a reference entity or a direction. The spatial relations are between an entity, *the man*, and a reference entity (*house*) or a cardinal direction (*north*). In contrast, the relative frame of reference is ternary since the spatial relation explicitly relies not only on an entity and a reference entity, but also lexicalizes the relative viewpoint of someone (most typically the speaker).

Another logical property is that of transitive and converse inferences. The relative and the absolute frames support such inferences. This is shown in (6a) and (7a) where the converse spatial relations in the relative and absolute frames of reference maintain the truth of the statements in (6) and (7). In (6a), we see that the converse relation for the intrinsic frame of reference does not necessarily maintain the truth of the statement in (6a), but can just as well express a different situation.

(6a)   *The house is to the right of the man.*

(7a)   *The house is in front of the man.*

(8a)   *The house is to the south of the man.*

Linguistic frames of reference are a prime candidate for a semantic typology: they exhibit clear constraints on variation and the properties of the different frames of reference are defined independent from their linguistic manifestation. Second, the three types are dispersed differently across languages.

5.1.3   Motion Events

In 5.1.2, we looked at how languages can vary in static descriptions of spatial relations. But there is also variation in how dynamic events, and particularly motion events are described across language. Roughly, we can think of motion as concerned with at least two different aspects. On the one hand, there is perceptually salient information about how something or someone moves, such as *jump*, *run*, *dance*, and *spin*. On the other hand, moving can result in a change in position, for instance from the outside to the inside of a building.

When we look at the expression of motion (and even more generally, events) there is a clear difference between Romance and Germanic

languages. Either the verb expresses, as in the Spanish example (9), change
of location, or the verb expresses how the object moved, leaving the loca-
tional change to be expressed in an associate to the verb, as in the Swedish
sentence (10).

(9) *La*   *botella*   *entró*   *a*   *la*   *cueva.*
     DET.DEF.F   *bottle*   *enter*.PST   *to*   DET.DEF.F   *cave.*

     (The bottle entered the cave.)

(10) *Flaska-n*   *flöt*   *in*   *i*   *grotta-n.*
     Bottle-   *float*.PST   *in*   *in*   *cave*-DET.DEF
     DET.DEF

     (The bottle floated into the cave.)

In Spanish, the spatial transition from or to a location, called **path** in mo-
tion semantics, is expressed in the main verb root. Swedish uses a different
way to express the same state-of-affairs. How the bottle moved, **manner**,
is expressed in the main verb root, which leaves Path to be lexicalized out-
side of the verb root in a verbal associate that has been called **satellite**. By
lexicalizing Path in the verb root, Spanish can omit the Manner of motion,
or express it in an optional gerund, *flotando* (floating).

Motion-expressing verbs typically bundle motion together with semantic
information about change-of-location or type of movement: they conflate
(co-express) the fact of motion with additional semantic categories. Talmy
(2000) proposes that four different semantic categories can conflate with
motion: MANNER (*roll*, *spin*), CAUSE (*throw*, *hit*) FIGURE (*rain*, *spit*)
and PATH (*enter*, *arrive*). This semantic analysis in the components that
are co-expressed with motion forms the basis for a semantic typology in
two types of languages. It is important to remember that the typology does
not intend to capture all types of motion, but only those types in which an
object changes location. In other words, it is a typology of the expression
of how Path is expressed: either in the main verb root or in a satellite. The
cross-linguistic pattern of preferring one or the other strategy has led to
differentiating between **verb-framed** and **satellite-framed languages**, or
V- and **S-languages** for short.
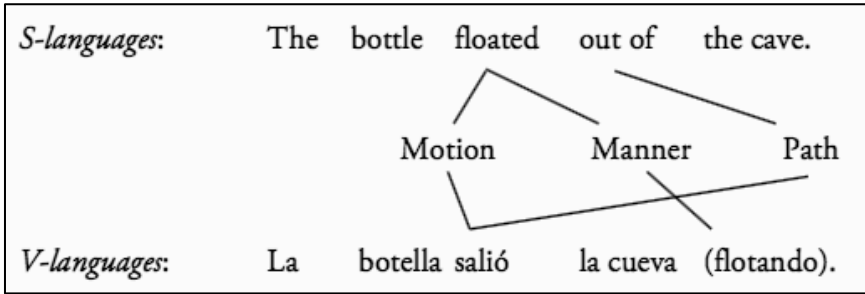
Figure 5.4: Satellite- and Verb-framing in English and Spanish (Blomberg 2014: 49)

In support of this typology, a number of features associated with both S- and V-languages have been attested:

- S-languages often have verbs that distinguish between fairly similar ways of movement, such as *walk, stroll, saunter, hike, amble* etc.

- S-languages can express more than one ground element per clause, whereas V-languages typically specify only one ground element per clause.

- V-languages use more static scene-setting descriptions than S-languages (Slobin 1996).

- V-languages do not readily combine Manner-verbs with expressions of state-transition in the same clause. When the main verb expresses Manner, the preposition is typically interpreted as expressing location rather than change in location (11). To then convey the sense of state-transition with both Manner- and Path-elements, V-languages express Path in the main verb and Manner in an optional sentential constituent such as a gerund in Spanish (12). This has been called the **boundary-crossing constraint** of V-languages (Slobin/Hoiting 1994).

(11) *La   niña   corrió   dentro   de-l   jardin.*
      DET.DEF.F *girl*   *run*.PST *in/*into* DET.DEF.M *garden*
      (The girl ran in the garden.)

(12)

La	niña	entró	corriendo en	el	jardin.
DET.DEF.F	*girl*	*enter*.PST	*run*.PTCP *in*	DET.DEF.M	*garden.*

(The girl entered the garden running.)

The typology is based on an asymmetry between the division of labor between main verb roots and surrounding form classes. Languages that can chain verbs together into verb series need not make the preferential choice of either lexicalizing Path or Manner in the verb: they can do both. For instance, Thai can combine up to three semantically different motion verbs in a single clause, as shown in (13). The verbs *wing* (run), *khâw* (enter) and *paj* (go) all express motion, all of them have equal syntactic status. For this reason, the binary division in two types of languages might require extension to account for additional language types. A proposed third type is that of **equipollently-framed languages**, where Path and Manner are expressed in a verb-serializing construction (Slobin 2004).

(13)

Phuchai	*wîng*	*khâw*	*paj*	*nai*	*umong.*
Man	*run*	*enter*	*go*	*inside*	*cave.*

(The man runs to the inside of a cave.)

Motion event typology shows that evidence from additional languages might lead to revision of typologies. Research on motion has shown many languages that do not fit neatly into the binary division, and the question on how many different types there are is a question that is still debated in the literature.

Since languages have different strategies for expressing motion, it illustrates a relevant concern when learning a second language. What is expressed in a certain way in one language might require a different 'packaging' in another language. As we saw with the boundary-crossing constraint in (11) above, it is not preferential in Spanish to use a Manner-verb to express a change in location.

5.1.4   Body Parts

Going back to our learning goal to be able to tell the differences between **universalism** and **relativism** let us consider the domain of BODY PARTS

again. The human body is both a part of the self and a part of the world. This is true for everyone everywhere in the world. My body belongs to me, but it is also a physical entity that can be perceived. It is through the body that we get around and get to know the world. From a perceptual standpoint, the body is easily segmented into parts due to "visually discernible discontinuities" (Enfield/Majid/van Staden 2006: 141) like *legs*, which can be further divided into *thigh*, *shin*, *ankle*, and so forth. As we have seen previously in Chapters 3 and 4, the body is also important in the semantic organization of meaning, for instance in metaphors. Moreover, many words for spatial locations and topological relationships have historically emerged from body part terms (for instance spatial locations such as *in front* and *in back*, or *river mouth*; see Heine 1997). All of this speaks in favor of the body as a prime candidate for universal categorization across languages (see also 5.1.1).

Is the categorization and segmentation of the body universal across languages or is it a domain that exhibits cross-linguistic variation? The answer is somewhat counterintuitive: even though all human beings have the same type of body, languages do not name its parts in the same way. A first indication of variation is that several languages do not have a word corresponding to *body* (for instance Tidore and Kuuk Thayorre). Lavukavele does not have a word for *arm* and Jahai lacks a word for *mouth* (Enfield 2006). Some languages seem to prefer finer level of segmentation. We find, once again using Jahai as an example, that there are no words for *arms*, *legs*, or *limbs*. Another interesting aspect of body part segmentation is what is taken to be a body part. Some languages include parts that cannot be perceptually discerned. For instance, Punjabi *kɔDDi* means 'organ in chest cavity deemed to be responsible for sickness' (Majid 2006). Similarly, the soul or the life force is in Jahai and Yélî Dnye taken to be a part of the body. Examples such as these have been seen as questioning if there is a cross-linguistically shared notion of 'body' (Sinha/Jensen de López 2000).

It has proven difficult to systematize body part terms into a coherent typology. There is a large degree of variation without clear limitations and constraints on how the body is segmented across languages. Despite this, or maybe even precisely because of this, it makes a valuable contribution to research on linguistic diversity.

5.1.5 How Semantic Diversity Can Be Studied

An important part of semantic typology is to gather data from languages spoken in different geographical regions and belonging to different genealogical language families. If typological investigations are limited in these respects, similarities and differences might become exaggerated due to a limited sample where similarities are due to language contact and traits inherited from a common ancestor. This is why typological comparisons should preferably use a geographically and genealogically balanced sample. Even if the exact number of languages required for typological comparisons are not carved in stone, typologists attempt to use a balanced sample of the world's languages. Looking at languages from different language families with variation in their structure allows for a more representative picture of the constraints and variation across languages.

While it could be possible to use dictionaries as the basis for typological comparisons, this is undesirable for two reasons. First, not all languages have dictionaries and not all words might be covered in a dictionary. Second, dictionaries do not allow for specifying the appropriate question and method for investigating semantic diversity. The data for typological comparisons are, therefore, often gathered by asking native speakers to describe a particular phenomenon, such as MOTION or SPACE. This can be done with questionnaires simply asking speakers to name things in their language. An alternative method is to use elicitations with pictures or videos representing the type of situations investigated.

The two methods of questionnaires and elicitation can be combined. When investigating body part terms, it is common to use simplified drawings of the human body. Each drawing gives a body part term in the participant's native tongue, and the participants are asked to color in the named body part on the drawing. The so-called body-coloring task is shown in Figure 5.5. For instance, in English, a participant given the word *leg* might color in the part from the hip to the feet. By comparing with other languages, one can then investigate the variation in body part terms across languages.
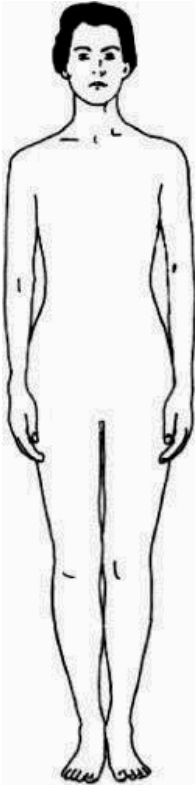
Figure 5.5: The body coloring task (van Staden/Majid 2006)

5.1.6 Summary

- This chapter has focused on how to describe diversity in the expression of meaning across the world's languages.
- A systematic description of a domain such as MOTION or SPACE makes up a semantic typology where languages preferentially or exclusively use a certain way of describing the domain in question.
- For some domains, it has even been difficult to come up with a systematic typology. This can in part be explained by the nature of the domain: the different ways to segment the human body might not be generalizable into a defined number of types.
- Thus, cross-linguistic variation cannot be denied.

- Is it possible to find generalizable constraints on variation, or do languages vary in principle indefinitely?
- If variation is limited, how this should be explained is a heated debate: either universal properties shared by all languages or without postulating such properties.

5.1.7 Review Questions

1. What is the difference between lexical and grammatical diversity?
2. Is English a satellite- or a verb-framed language?
3. Do all languages have a word corresponding to English *body*?
4. Classify the following motion verbs as either Path- or Manner-verbs (*enter – walk – run – roll – cross*).

5.2 Linguistic Relativity and Cross-Linguistic Differences

Johan Blomberg

In 5.1, we saw that there are differences in what type of meanings languages express. The systematic patterns of linguistic diversity across the languages of the world lead to asking a different set of questions concerning the extent of which differences between languages can be correlated with possible differences in how speakers of different languages think. In this chapter, we look at the proposal that language shapes thought and that linguistic differences lead to corresponding differences in thought. This position is known as **linguistic relativity**. We begin by introducing this position together with some of the controversies and heated debates that has surrounded linguistic relativity. We then discuss how the discussion has developed over the last few decades. We do so by addressing some of the key arguments for and against linguistic relativity. The chapter ends with touching on few important empirical studies investigating the relationship between language and thought.

Study Goals

This chapter will enable you to:

- account for linguistic relativity
- present some arguments for and against linguistic relativity
- assess what type of linguistic differences could be a possible candidate for linguistic influence on thought.

5.2.1 What Is Linguistic Relativity?

Imagine that you are reading the newspaper. On one page, you find a story from a contemporary political conflict, which is described as an unjust war between freedom fighters and an oppressive regime. Now, imagine, that the former is changed to 'terrorists' and the latter to 'democratically elected government'. Would your impression of the conflict have changed?

This example is a matter of lexical decision: the words we use to describe (or construe) the same extra-linguistic state of affairs. If we describe a

political group as 'terrorists', we are given a radically different interpretation than if the same group were described as 'freedom fighters'. However, as we saw in Chapter 5.1 languages do differ in the resources available for referring to the same phenomenon. When a speaker of the Mayan language Tzeltal (spoken in the Chiapas region of Mexico) provides directions, she would say something corresponding to the English sentence *When you reach the end of the road, turn west*. English speakers would normally use spatial reference based on the viewpoint of the speaker (deictically anchored), *left* and *right*. However, such deictic locutions are missing from Tzeltal. Instead, speakers provide spatial reference roughly corresponding to cardinal bearings, such as *east* and *west*. This perspective on space is used to specify spatial location at all different scales, including long distances as well as for immediate surroundings. A speaker of Tzeltal would, therefore, say that *the cup is to the east of the plate*.

Since there is no way to translate between the typical Tzeltal and the typical English way to provide reference to spatial relations, can the variation in talking about space correlate with differences in thinking about space? The question can be generalized to asking whether sufficiently substantial and systematic differences between languages correlate with corresponding differences in thought. A controversial position is to answer yes to such questions. This is the position of linguistic relativity. In a simplified form, linguistic relativity can be framed as two premises and a conclusion deduced from them (Gentner/Goldin-Meadow 2003):

(1) Languages differ to a significant degree in their semantic structure, which means that they have different words for different things and carve up the reality in different ways.

(2) The words and grammatical categories influence how we make sense of the world, suggesting that the semantic structures influence the categorization of experience.

(3) Therefore, speakers of different languages will make different categorizations in their experience of reality, and hence make sense of the world in different ways.

The first premise states that linguistic differences are profound rather than superficial. Moreover, it suggests that meaning is embedded in language, and not just a means for expressing thoughts. We can take the expression of space in English and Tzeltal as examples. While both languages can express spatial relations equally well, they do so in quite different ways.

Tzeltal anchors space in cardinal directions independent of the speaker and hearer's perspective in the concrete situation.

As can be seen from the second premise, the structure of meaning in a particular language is used to understand and interpret reality. A Tzeltal speaker is required to keep track of where he or she is in relation to the cardinal directions, whereas an English speaker need not have a mental compass active. The relativist expectation is that having to rely on patterns specific to a language will inevitably lead to a specific way of thinking and categorizing corresponding experiences.

Let us now have a look at how the idea of linguistic relativity developed historically. The idea that different languages lead to differences in thought has a long-standing history. From a modern perspective, it can be traced back at least to Romanticist and Enlightenment thinkers such as Wilhelm von Humboldt (1767-1835) and Johann Gottfried Herder (1744-1803). In somewhat different ways, they both emphasized how different languages and cultural traditions are decisive in bringing people together under a single nation. According to Humboldt, each language exhibits a particular worldview ('Weltansicht' in German).

Herder and von Humboldt are important predecessors to the modern conception of linguistic relativity. It is however mostly associated with the North American linguists Edward Sapir and Benjamin Lee Whorf. They considered language to offer an interpretation of reality. For instance, a tense system distinguishing between past, present, and future (such as English or German) can be seen to cut up time in three distinct categories. They contrasted this with languages like Hopi, which they claimed lack a tense system and instead express temporal relation solely by marking aspect. This led Sapir and Whorf to propose that speakers of different languages are guided by different linguistic cues in understanding and interpreting experience. Given sufficiently large differences between languages, there would be corresponding differences between speakers in their categorization of reality (Carroll 1956).

Sapir and Whorf have been charged for inconclusive and faulty comparisons between languages (see Malotki 1983). Simply put, the differences between languages like English and Hopi might have been exaggerated. Moreover, their interpretation seems to lead to the conclusion that linguistic differences determine corresponding cognitive differences. The argument can be seen as circular: linguistic differences are both the premise

and the conclusion. The cartoon in Figure 5.6 illustrates this debate by turn-
ing the point of view away from a Western perspective.

Figure 5.6: A comic strip commenting on the debate over linguistic relativity
(Speed Bump 2006. Reprinted with permission from Dave Coverly)

One main question in linguistic research has been the similarities between
languages and the preconditions for acquiring a language. Given that the
ability to learn a language is shared by all human beings, the effects from
linguistic diversity would presumably be too marginal for a convincing
case of linguistic relativity. This dismissal is bluntly stated by Steven
Pinker:

> [T]he Sapir-Whorf hypothesis of linguistic determinism states
> that people's thoughts are determined by the categories made
> available by their language, and its weaker version, linguistic rel-
> ativity, that differences among languages cause differences in the
> thoughts of their speakers. [...] But it is wrong, all wrong. (Pinker
> 1994: 57)

From such a perspective, the possibility of linguistic relativity was met with skepticism and was for a long time abandoned as a research inquiry. In this quote, Pinker attributes Sapir and Whorf with advocating linguistic determinism rather than linguistic relativity. Whereas the former position states that language determines what thoughts are possible, the latter is the more modest position of taking language to shape thoughts.

After a period of mistrust in linguistics and cognitive science, linguistic relativity has for the last few decades been conceptually clarified to avoid the pitfalls of linguistic determinism. At the same time, it has been methodologically rehabilitated to better meet the standards of empirical research, in part informed by the examples of semantic diversity discussed in 5.1. In the remainder of this chapter, we discuss and evaluate some of the more important research on linguistic relativity.

5.2.2 For and Against Relativity

The relativistic position has been considered controversial, and is often criticized for faulty reasoning and leading to absurd conclusions. If people literally think in natural language, then it seems to follow that those without language, such as other animals and pre-linguistic children, would be incapable of thought. It has been shown that other animals are capable of behaving in accordance with complex processes of thinking, such as making conscious decisions, planning for the future, understanding the intention of others (see for instance Tomasello/Call 1997). A second objection concerns the possibility of acquiring a second language. Many people do speak more than one language – even languages that differ radically – something that would not seem to be possible if a native tongue operated as a strong constraint.

Objections such as these have led to a differentiating between different types of relativistic effects. On the one hand, there is a **strong** form stating that language determines what type of thoughts are possible. A metaphor that can exemplify this is that language is like a prison to the mind in which we are all held captive. On the other hand, there is a **weak** version of **linguistic relativity**. Such a reading suggests that language influences rather than determines how one thinks. On such a reading, we are not trapped by language, but it is rather that how we think typically goes hand in hand with language.

Even though interpretations vary, it is possible to intrepret lingusitic relativity as the claim that language can influence how people tend to think, and not which thoughts that are possible in principle. In other words, just because a language such as Pirahã (spoken in the Brazilian parts of the Amazon rainforest) lacks number words over three does not entail that Pirahã speakers cannot count to four (Everett 2005).

To ascertain the limits and validity of the relativistic position, the last 25 years have seen a growing body of empirical research on many different languages and many different types of phenomena. In the remainder of this section, we discuss some interesting studies. In doing so, we will also touch upon some interesting differences between languages. The section ends with evaluating what these studies can tell about the relation between language and thought.

5.2.2.1   Color Naming Tasks

An early example of empirical research on the relation between linguistic differences and corresponding differences in thought is color categorization. As is well known, languages categorize the color spectrum somewhat differently. For instance, Russian makes a distinction between lighter and darker hues of blue (*голубой* ('goluboy') and *синий* ('siniy'), respectively). If linguistic categorization influences thought, it could be expected that differences in color categorization would affect the recognition of colors (cf. Winawer/Witthoft/Frank/Wu/Wade/Boroditsky 2007).

One of the most famous investigations was the survey of color terms in a vast array of languages conducted in the 1960s by Brent Berlin and Paul Kay (Berlin/Kay 1969). They argue that color naming follows universal patterns rather than randomly dividing and arbitrarily lexicalizing across languages and culture, so called **basic color terms**. They define such a term according to a number of criteria:

1. A basic color term is not a compound (*blue*, but not *dark blue*).
2. Its meaning is not included in that of any other color term (*maroon* is a red color, but not vice versa).
3. unrestricted in its application
4. psychologically salient (tend to occur early in elicited lists).

Specifically, while languages might vary in how the color spectrum is divided, and in how many color words there are, there is still strong cross-linguistic agreement in which hues are considered as focal. In a language with few color words, the hues chosen as focal are predictable. For instance, if a language has two color words, then these correspond to light and dark. The proposed typological hierarchy of color naming terms is shown in Figure 5.7.
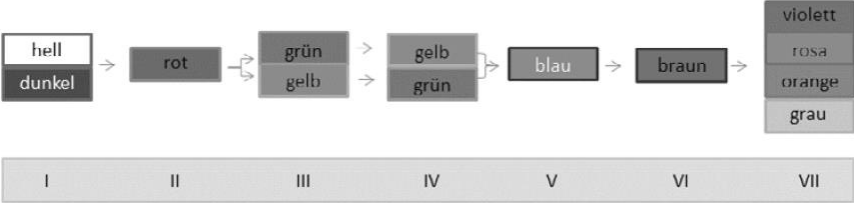
Figure 5.7: Typology of basic color terms adapted from the proposed typology from Berlin & Kay (1969)

The status of color naming has resurfaced in recent years. Some studies have found that language-specific color naming enhance recognition of differences in colors (Roberson/Davies/Davidoff 2002, Lupyan 2012), and others argue that Berlin & Kay's conclusions are based on flawed assumptions about language (Saunders 2000, Levinson 2000).

Experiment 1

Ask three persons to name color terms. Which were the first 10? How many of them correspond to basic color terms according to the criteria listed above?
Look at http://wals.info/feature/133A#2/32.5/151.7 to see where your language fits among those investigated.

5.2.2.2   Spatial Orientation

Just as with color, languages have different ways to organize space. We have already mentioned the difference between Tzeltal and English in this regard. To remind, Tzeltal employs terms corresponding to *east* and *west* for spatial orientation. English, on the other hand, uses either deictic (or relative) specifications such as *left* and *right* or configurations of spatial

entities, such as *in front of*. These three different ways to describe the same spatial situation was shown as Figure 5.3 in Chapter 5.1.

To test whether these different linguistic preferences impact on non-linguistic categorization, a number of different experiments and studies have been conducted (summarized in Levinson 2003 and Majid/Bowerman/Kita/Haun/Levinson 2004). In one experiment, speakers are asked to remember the order of three objects on a table (represented as the square, the black dot, and the white circle in Figure 5.8). After turning 180˚, participants are asked to recall the order of the objects. The task can be solved either in a relative frame of reference where the left-right order is used, or in an absolute frame retaining the cardinal directions. The setup is shown in Figure 5.8.
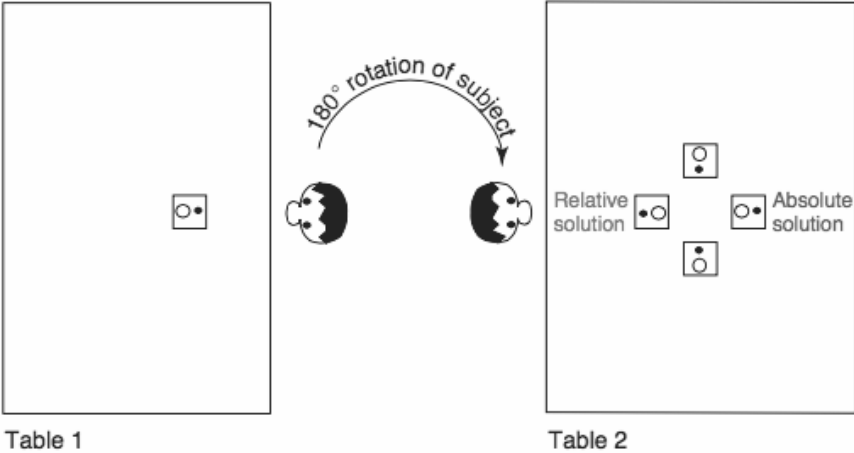
Figure 5.8: The experimental setup with relative and absolute solutions (Majid/Bowerman/Kita/Haun/Levinson 2004: 110)

If the language-specific patterns affect recall, it would be expected that Tzeltal speakers would use cardinal directions to order the objects, whereas Dutch speakers would prefer to retain the speaker-relative left-right order. The study supported the relativistic hypothesis: Tzeltal and Dutch speakers typically solved the task differently, and in line with the language-specific pattern for expressing spatial relations.

A study more attuned to everyday experience tested whether absolute and relative frame of reference affected orientation in unfamiliar terrain. The

relativistic hypothesis is that speakers using the absolute frame would keep track of the cardinal directions (or corresponding locutions), and, therefore, be better at orienting themselves than speakers of Dutch or English. It turned out that speakers of Tzeltal and Guugu Yimithirr (an Aboriginal language where the absolute frame of reference is prolifically used) were much better than Dutch speakers at keeping track of where things were located even in an unfamiliar terrain (Levinson 2003).

Experiment 2

Conduct the experiment described in 5.2.2.2 on at least three persons. You can use three similarly sized small objects and then ask the persons to turn around 180° and re-arrange them. Did your participants follow the expectations of spatial orientation in their language?

5.2.2.3 Space-Time Metaphors

In Chapter 3, we discussed metaphors as systematic mappings between domains. One particularly important mapping is that from SPACE (source domain) to TIME (target domain). Even if many languages use this mapping, they can differ in how this is realized. English speakers typically map time onto the horizontal axis, including sentences like (1) and (2).

(1) *Christmas is ahead of us.*

(2) *The deadline was pushed back.*

Boroditsky (2001) claims that Mandarin Chinese frequently use the vertical axis for temporal expressions. Examples of these mappings from vertical space to time is shown in (3) and (4). As can be seen, the verbs for *climb*/*descend* can be used to express temporal senses of past and future events.

(3) a. *māo **shàng** shù*   space
        cats climb trees

    b. ***shàng** ge yuè*   time
        last month

(4) a. *tāo **xià** le shān mèi yǒu*   space
         has she descended the mountain or not?

     b. ***xià** ge yuè*   time
         next month

<div align="right">(Boroditsky 2001: 6)</div>

In a number of experiments, the possible influence from spatial metaphors on temporal representation have been investigated (Boroditsky 2001, Boroditsky/Fuhrman/McCormick 2011). Their claim is that if language influences thought, then we would be able to find differences between Mandarin and English speakers in this regard. The experiments are carried out in different tasks, but they typically involve making a judgment about time, such as to view two images of the same person and ascertain in which of the images the person is older. In other studies, the task is to respond to a statement about time (like *March comes before April*). To investigate whether performance in these tasks is affected by language-specific spatial metaphors, the experiments often involve an additional spatial parameter. This can be done with for instance **priming**. Priming involves the exposure to one stimulus that influences the response to another stimulus. In this specific task, the prime consists of spatial information which is either congruent or not with the following temporal information. For instance, prior to responding to the temporal task, participants are exposed to some form of spatial information congruent or not with the metaphorical mapping of one's language. If this leads to differences in performance, one can expect the prime to affect performance. The results from studies on space-time metaphors are inconclusive and seem to vary between studies (Chen 2007).

5.2.2.4   Grammatical Gender

Many languages have grammatical gender, which at first glance might not seem to be a meaningful distinction, and not apparently systematic. To test whether grammatical gender nevertheless influences speakers of different language, Boroditsky, Schmidt & Phillips (2003) investigated speakers of German and Spanish (both languages have grammatical gender). When asked to write down a few adjectives which came to mind for different nouns, German and Spanish speakers differed in their associations dependent on the grammatical gender of nouns. For instance, *Schlüssel* (key) has a masculine gender in German, which in this study lead to associations such as *hard*, *heavy*, *jagged,* and *useful*. Spanish speakers on the other hand

associated the feminine *llave* with *golden*, *intricate*, and *lovely*. For words with the opposite grammatical gender (such as *Brücke* and *puente* (bridge)), the associations were the reverse for German and Spanish speakers.

Language	Spanish	German	Spanish	German
Gender	Masculine	Feminine	Feminine	Masculine
Association	*hard*, *heavy*, *jagged,* and *useful*.	*golden*, *intricate*, and *lovely*	*golden*, *intricate*, and *lovely*	*hard*, *heavy*, *jagged,* and *useful*.

Table 5.1: Associations based on grammatical gender in Spanish and German reported in Boroditsky & Schmidt (2002). Adapted from Boroditsky & Schmidt (2002)

Experiment 3

Conduct a similar experiment as described in 5.2.2.4. Find bilingual speakers. Use 10 nouns, 5 with masculine grammatical gender and 5 with feminine gender in one of the languages. Ask speakers to write down 5 adjectives they associate with each noun. Did your participants follow the same pattern as those in Boroditsky & Schmidt's study? Can you observe differences in the quality of the adjectives used?

5.2.2.5 Evaluation

Studies on different aspects and forms of human cognition and its relation to language have yielded different and seemingly conflicting results. Studies on categorization of perceptual phenomena such as color have yielded less support for the hypothesis that language plays some role in the way we think than studies on memory, attention, and spatial orientation. This variation suggests that the type of task and context matters as well. Even though there is linguistic variation in color naming, the perception of color is still hard-wired by the physiology of the eye, and thereby subject to strong constraints.

In this way, we could say that linguistic relativity is not only a matter of a gradient scale ranging from no influence to complete determination. There might also be different types of relativistic effects dependent on the situation and the type of thinking involved. This view on relativity has been put

forth by for instance Wolff & Holmes (2010) and Zlatev & Blomberg (2015).

5.2.3 Summary

- This chapter has given an overview of what the idea that 'language shapes thought' can imply, specifically that differences between languages correspond to differences in thought.
- The question 'Does language shape thought?' is imprecise and, therefore, difficult to answer with a definite yes or no.
- It matters to a large degree how notions such as 'language', 'thought' and 'shape' are interpreted.
- Just as 'language' has different readings so does 'thought', which includes vague notions in need of specification to allow for adequate investigation.
- We have discussed some different ways to specify this question further and scrutinize whether, and if so to what extent, specific aspects of language (such as the system for spatial specification or grammatical gender) influence specific types of cognition (such as declarative memory or categorization).

5.2.4 Review Questions

1. What is the difference between strong and weak forms of relativity?
2. How has research in linguistic relativity changed over the last decades?
3. How has spatial frame of references been used to investigate possible linguistic effects?

5.3 Linguistic Diversity, Relativity, and Cognitive Linguistics

Johan Blomberg

We began Chapter 5 by asking to what extent languages share essential properties in the expression of meaning. From the discussions of semantic diversity in 5.1 and linguistic relativity in 5.2, we turn to possible cognitive explanations for variation in this section. From a cognitive linguistic perspective, it is expected that languages would be similar in that all of them have the possibility to express cognitively basic domains such as SPACE. We have seen that languages vary in the expression of such domains, and have also noted empirical indications that such variation correlates with cognitive differences. Cognitive linguistics has primarily been concerned with studying principles assumed to be essential to conceptual and linguistic abilities. To investigate the validity of these claims, it is all the more important to test them against actual linguistic material gathered from representative samples of the languages of the world (van der Auwera/Nuyts 2007). With insights from studies on cross-linguistic differences and their possible correlation with cognitive differences, we are now in a position to relate these back to cognitive linguistics.

This chapter addresses the following three questions:

1. What are the implications of semantic variation for cognitive theories of language?
2. How can semantic variation be explained from a cognitive perspective?
3. Are there linguistic universals, i.e. are there some things that appear in all languages and if so, what type of universals are there?

Study Goals

This chapter will enable you to:

- be able to account for mechanisms and constraints on variation
- provide examples of variation and discuss their implication for cognitive theories
- differentiate between different types of universals.

5.3.1 Semantic Variation and Cognitive Linguistics

In Chapter 3, we discussed metaphors as systematic and asymmetrical mappings between different domains such as TIME and SPACE. The tendency to express temporal relations with spatial terms is an example of so-called **primary metaphors**, which have been claimed to be universally shared across languages (Grady 1997, Kövecses 2002). The extent of which this holds true across languages has come into question in recent studies. Let us discuss two such studies, but remember that the findings from these studies might require additional corroboration by future research.

A study of the Amazonian language Amondawa spoken in Brazil argues that this language has no word meaning *time*, and no words for temporal units such as *months*, *weeks*, and *years*. Temporal reference can be attained by names for seasons and parts of seasons, for *day* and for *night* and parts of the day like *morning* and *night* (Sinha/da Silva Sinha/Zinken/Sampaio 2011). Apart from a restricted vocabulary for *time*, Sinha and colleagues argue that Amondawa does not recruit spatial senses to express temporal meanings. That is, words expressing spatial relations do not extend into the domain of TIME, which means that verbs with meanings like *go* or prepositions like *at*, *on*, and *in* cannot be used to express temporal senses, such as in the English examples in (1) and (2). In (1) the future tense is expressed with the help of a motion verb, and (2) conceives of a period of the day as a container. By contrast to such mappings between SPACE and TIME, temporal relations in Amondawa are expressed by adverbial particles and dependent morphemes that are typically deictically anchored in the immediate context. An example of how Amondawa expresses temporal relation without using the resources for spatial relations is exemplified in (3). In other words, Amondawa has been proposed to lack the type of space-time metaphors discussed in Chapter 5.2.

(1) *It is going to rain tomorrow.*

(2) *We met in the morning.*

(3) *T-aho   koro ́i   ga nehe.*
  REFL-3SG.*go* *now*.INTENS *he* FUT
  (He will go out (from here) just now.)
        (Sinha/da Silva Sinha/Zinken/Sampaio 2011: 157)

Another example of variation in space-time metaphors for basic cognitive domains is found in the South American language Aymara, spoken in the Andes regions of Bolivia, Peru, and Chile. Aymara presents a more limited challenge to a universalist claim. In English and many other languages, the future is conceptualized as 'ahead' and the past as 'behind', such as *Christmas is ahead of us* or *three years back in time*. This mapping between time and spatial directionality has been proposed as a universal form of mapping. However, Aymara uses the opposite mapping with past as something that is 'in front' and the future as 'behind' (Nuñez/Sweetser 2006). Examples of this are shown in (4)-(6) below where the meaning of 'past time' is expressed with for 'front'. In other words, references to temporal events use words such as *front* to indicate the past, and words like *back* to speak about the future.

(4) *nayra mara* (last year)

    literal gloss:

nayra	*mara*
eye/sight/front	year

(5) *ancha nayra pachana* (a long time ago)

    literal gloss:

ancha	*nayra*	*pacha-na*
a lot	eye/sight/front	time in/on/at

(6) *nayra pacha/timpu* (*past time*)

    literal gloss:

nayra	*pacha/timpu**
eye/sight/front	time

<div align="right">(Nuñez/Sweetser 2006: 415)</div>

While these mappings might be entrenched to the degree that speakers are not any longer aware of the mapping from space to time, it has been shown that the co-speech gestures produced by Aymara speakers might indicate a spatial conceptualization of time. When speaking about the past, Aymara speakers indicate forward motion from their body, and in the opposite direction for speaking about the past. An example of this is shown in Figure 5.9 where the word *antiguo* (old) is accompanied with a frontward hand gesture.

Figure 5.9: Example of a gesture indicating a *past-is-front* mapping (Nuñez/ Sweetser 2006: 428)

Nuñez & Sweetser find a possible explanation for this reverse pattern in the relation between visual perception and knowledge. English and many other languages use perception verbs for expressing epistemic stance (for instance *I see* with the meaning 'I understand'). On such a view, the past is known in the sense that it has been witnessed and experienced. By contrast, the future is yet to been experienced and is, therefore, – just as that which happens behind our backs – not immediately known. Such an account provides a motivation for conceiving the past as being in front of us and the future as being behind us.

Experiment 1

Ask two persons to briefly describe events in the past and the future, such as (1) a childhood memory, (2) what they did last week, (3) what they will do next week, and (4) what they want to do in 20 years. Pay attention to how they talk and gesture about the past and future: do they follow the pattern of PAST IS BEHIND and FUTURE IS AHEAD? Describe the results from your experiment briefly with examples. To help with your analysis, you can look back at the explanations for the linguistic examples (1)-(6) above.

These types of differences put the strongest form of universalism into question. They challenge the idea that all languages exhibit the same cross-domain mappings. However, they need not be inconsistent with a cognitive perspective. Consider for instance basic cognitive categories such as CON- TAINER in cognitive linguistic analysis. It would not be unexpected if such concepts would be shaped and conditioned by the particular living within

dwellings of various architectures, and the interior design of houses (Palmer 2007). Such type of cultural and environmental factors influence even on basic categories is not inconsistent with a more modest thesis that anticipates interaction between categories and environment. As put by Geeraerts & Grondelaers (1995: 177): "if cognitive models are cultural models, they are also cultural institutions". In other words, language is not seen as a cognitively isolated phenomenon, and neither are language and cognition seen as strictly separate from culture and environment.

5.3.2 Cognitive Mechanisms and Explanations to Semantic Diversity

We have seen differences between languages and have acquainted ourselves with different ways to describe them. Such a descriptive endeavor does not provide us with a reason or explanation to either linguistic diversity or allow us to postulate constraints on variation. A partial cause is that the variation in meaning has to be interpreted and must, therefore, rely more on a theoretical framework. In this section, we look closer at attempts to explain variation from cognitive linguistic perspectives.

A typical property of these explanations is their functional character. This means that explanations to linguistic phenomena should be sought in the relation between linguistic structure and the purpose these structures serve in communication. From a cognitive-functional point of view, languages serve functions that are in general regulated by cognitive principles. The function of, for instance, a word class like nouns is to classify things, or perhaps more accurately to construe something as a thing. To seek functional motivations for grammatical categories and typological patterns is a typical characteristic of cognitive approaches to semantic diversity. An example of such an explanation concerns the cross-linguistically common strategy to express possession with locative constructions of the type 'Y is at X's place' (Heine 1997). Rather than using a verb corresponding to English *have* or German *haben*, languages like Russian express possession through locative constructions. Example (7) shows this kind of possessive construction.

(7) *У   меня   книга.*
     at   me   book
     (I have a book.)

A cognitive linguistic explanation for the possessive meaning relies on a so-called **event schema** according to which physical contiguity between two entities can be seen as one of them possessing the other. The event schema is in turn "part of the universal inventory of cognitive options to humans" which "appear to be but one manifestation of a more general cognitive mechanism that is recruited for understanding and transmitting experience" (Heine 1997: 222-224).

5.3.2.1 Semantic Maps

If linguistic variation can be understood in terms of the specific functions served by linguistic forms, and these functions are by and large determined by cognitive principles, then variation can be seen to follow from the way these functions are mapped on to grammatical constituents. One attempt to account for the relation between form and function is that of **semantic maps** (Haspelmath 1997). A particular word (typically grammatical function words like prepositions) can be shown to express different functions. For instance, the English preposition *to* can be used to express various functions, as shown in (8a-d) (examples from Haspelmath 2003: 211).

(8) a. *Goethe went to Leipzig as a student.* (direction)

 b. *Eve gave the apple to Adam.* (recipient)

 c. *This seems outrageous to me.* (experiencer)

 d. *I left the party early to get home in time.* (purpose)

On the basis of cross-linguistic generalizations, the type of functions (which is used neutrally with respect to different uses or different senses) that can be expressed by adpositions and cases like *to* can be represented as a semantic map. The functions of *to* can be mapped out and compared to the functions of other grammatical morphemes in the same language. This can then be compared to the relation between forms and functions in other languages, like French. Generally, Haspelmath (2003) has proposed that the function of dative (expressed by *to* in English) can be mapped as in Figure 5.10.
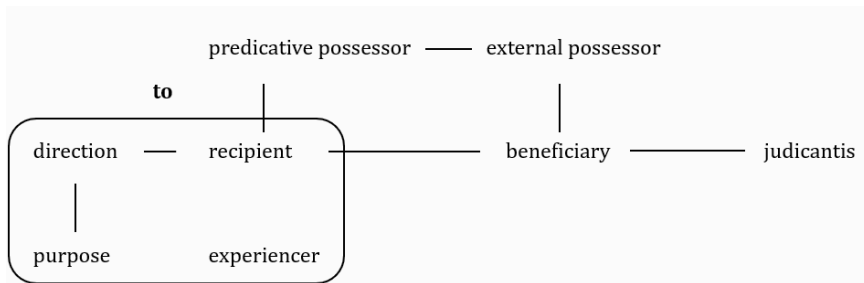
Figure 5.10: A semantic map of typical dative functions (Haspelmath 2003: 213)

In this figure, the space of possible meanings that can be expressed by a particular function, in this case the dative function, is mapped out. One and the same language need not have all meanings expressed by the same function. For instance, judicantis, 'the judger's dative' which is used to express some kind of judgement made by the speaker about a situation is not expressed by *to* in English, but by *for* (see 9a and b). In contrast, German uses the dative function to express judicantis.

(9) a. *That is too warm for me.*

   b. *Mir ist das zu warm.*

<div align="right">(Haspelmath 2003: 213)</div>

In this way, it is possible to represent cross-linguistic differences in which functions are expressed by similar/different forms. The exact status of semantic maps is however not entirely clear. Two different views have been put forth. On the one hand, semantic maps are considered representations of form-function mappings across languages. This is the view taken by Haspelmath (1997). On the other hand, semantic maps are considered as truly a map that primarily reflects the cognitive organization of the domain represented and secondarily their distribution across languages (Croft 2003).

5.3.2.2 Grammaticalization: From Usage to Grammar

We have seen that conventional linguistic forms serve particular functions, and that the relation between individual forms and function differ across languages. This does not answer the question how there can be stable linguistic forms and rules for combining them. Put differently, why is there

grammar? One possible answer is that language is comprised of content words like nouns, verbs, and adjectives that are inflected and joined together into more complex expressions by grammatical words and morphemes. From a functional perspective, such an understanding is however somewhat limited since it fails to tell us how there came to be such regularities and rules. A possible cognitive-functional explanation is that grammatical regularities emerge from recurrent use of particular constructions. Given that some constructions occur more frequently than others, this will lead to them become more established in memory. A straightforward example of this is phonetic reduction of high-frequency constructions. You can observe this phenomenon live: the English verb *gonna* is being formed from *going to*. This is the view of a usage-based approach.

An important facet of a usage-based approach to grammar is the role of constructions. We discussed constructions in Chapter 5 as systematic pairing between a form and the function it serves. Bybee (2006) argues that a large portion of language use is conventionalized in various forms of multi-word constructions including idioms (*beat around the bush*), and predictable word pairings (*mixed messages*, *beyond repair*) and more schematic representations like verb+*off*+noun (such as *blow the napkin off the table*). We can think about language as comprised to a large extent of such composites and when we combine this with the idea of frequency effect, it is possible to detail and describe the process through which grammar emerges from use.

The process through which grammatical words and morphemes develop from lexical units is called **grammaticalization** (or grammaticization). During this process, a lexical unit becomes more general in the functions it can express. Some grammaticalization patterns are quite common across languages. For instance, the Old English verb *willan* (to want/to wish) is an example of the common tendency of a verb expressing intention developing into an auxiliary verb marking future tense, as in *I will go to the movies tonight*. The same pattern can be detected in other languages, and the degree of grammaticalization can go even further. The Old Church Slavonic verb *xъtěti* is similar to Old English *willan*, but has in modern Serbo-Croatian become a fully fused inflection for future tense. If languages follow predictable patterns of grammaticalization, then it is possible to formulate expectations for future development in a particular language. If English *will* continues to follow the course, we can expect it to develop

into an inflectional affix for future tense. For more details on this process of grammaticalization, see Heine (1997).

It has been claimed that the grammaticalization processes follow strong tendencies across languages (Heine/Kuteva 2002). We have previously discussed the common tendency to express temporal relations in spatial terms. There is historical evidence that spatial markers often develop more abstract senses, but what is more interesting is that spatial markers in the first instance develop from body part terms. From a cognitive viewpoint, the process of grammaticalization as a continuous process of bleaching and extension from basic meanings can be expected. To think and talk about more abstract senses, we rely on concrete meanings. As a result of their recurrent usage to express several more and more general meanings, the word will lose the connection to a specific meaning and, as a by-product of its frequent use, develop into a grammatical unit. An example of how this process might occur is shown in Figure 5.11 below. In this example, we see how the English word *back* develops the meaning of a body part via a more general spatial meaning to the temporal meaning of past.
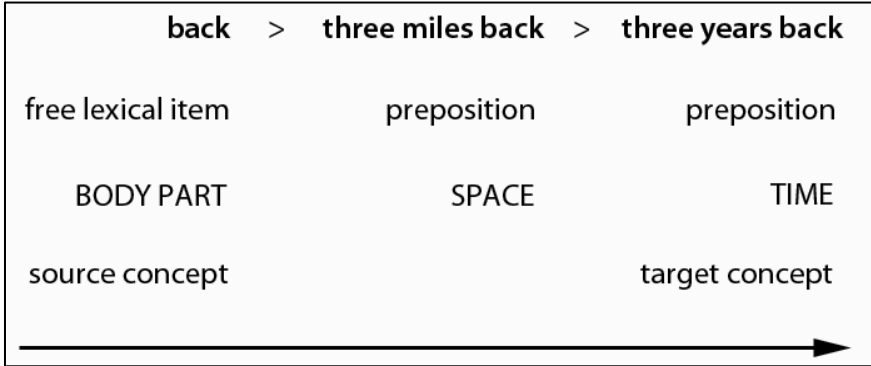
Figure 5.11: The grammaticalization process of *back* (Zeman 2011: 4)

5.3.3 Different Types of Universals

Linguistic variation is closely related to the question of universals. A universal is a trait hypothetically shared by all languages of the world. When linguists speak about universals, they do not necessarily have the exact same type of features in mind. Several different proposals and differentiation between types of universals have been made in the literature. In this

section, we discuss some of the different notions of universals that have been put forth, without claims to be an exhaustive list.

The first type of universal can be called **essential universals**. Such universals are definitional due to pointing to features that make something a language and not something else. One example of an essential universal could be that all languages have the resources for characterizing something about something, which in English is minimally made with a subject and a verb-only predicate (such as *she dances*). More formally, such a universal could be formulated as 'all languages have predication'. It seems impossible to think of a language not being able to have the resources to predicate, that is, to assert something about something. In the absence of such resources, we would arguably not consider it a language. Essential universals can be seen as more or less equivalent to what Hockett (1960) describes as design features of language. Since essential universals are universal by definition, they have not been studied from cross-linguistic perspectives.

A similar type of universals can be called **formal universals**. In the tradition of generative grammar, these specify constraints on grammar of languages, e.g. having certain restrictions on the general organization of grammar, or the distinction between deep and surface structure (Chomsky 1965). These constraints are often abstractly formulated and meant to explain why some patterns are grammatical and why others are not. Chomsky contrasts formal universals with **substantive universals**. These can typically be thought of as specific categories expected to occur in all languages, such as word classes or distinctive features in phonology. No individual language is expected to realize all substantive universals, and these can thus be seen as charting the general space of grammatical properties, such as word order.

From a cross-linguistic perspective, formal universals have been difficult to confirm or falsify. To a large extent, they are formulated within a particular theoretical framework and might, therefore, be difficult to compare outside of generative grammar. Traditionally, typologists have, therefore, been more interested in finding different kinds of universals. An influential differentiation in types of universals stems from Greenberg (1963), which we can represent as in Figure 5.12.

	Absolute (exceptionless)	Statistical (tendencies)
Unconditional (unrestricted)	Type 1. „Unrestricted absolute universals" *All languages have property X*	Type 2. „Unrestricted tendencies" *Most languages have property X*
Conditional (restricted)	Type 3. „Exceptionless implicational universals" *If a language has property X, it also has property Y*	Type 4. „Statistical implications universals" *If a language has property X, it will tend to have property Y*

Figure 5.12: The four types of universals proposed by Greenberg (1963) (adapted from Evans/Levinson 2009: 450)

Type 1 universals are similar to essential universals in that they are expected to hold true for all languages. They differ insofar as they are not a matter of being true by definition but are a matter of empirical discovery. Even if these are the characteristic kind of universals, there are no established Type 1 universals among linguists. The proposed types and counter-examples are too vast to consider in detail here, but possible candidates are 'all languages distinguish between nouns and verbs' and 'all languages have vowels'. The first has been contested and might depend on how the categories noun and verb are defined. The second candidate is in a sense close to definitional, since speech without vowels would not be comprehensible. Furthermore, it seems to exclude signed languages.

Due to the difficulty in finding Type 1 universals much typological work has been devoted to Type 3 universals. These concern implicational relations between logically independent parameters of the form 'IF a language has X, THEN it also has Y'. This means that properties of languages are related to one another in such a way that having one property means that another property is likely to appear as well. An example of an implicational

universal is 'IF a language has a trial number, THEN it also has a dual'. To have a specific grammatical marker for classifying three objects is logically independent of having a grammatical marker for classifying two objects. In other words, it is possible to think of a language with the trial number lacking the dual number. However, cross-linguistic research have found a regular patterning of these two properties, which in turn make this a candidate for an implicational universal (for a comprehensive list of universals, please consult: http://typo.uni-konstanz.de/archive/intro/index.php?pt=1). The implicational hierarchy for number is shown below. This can be read from right to left: IF a language has dual, THEN it also has plural.

Number: singular < plural < dual < trial

Just as with the problem in finding exceptionless Type 1 universals, many implicational universals seem to be more a matter of strong regularities across languages (Evans/Levinson 2009). In sum, to the extent that there are universals of these kinds, they seem to be largely a question of Type 2 and Type 4.

Experiment 2

Go to wals.info/feature. Here you will see a list of different features shared between the languages of the world. Choose one of them, for instance *hand/arm* under 'Area': Lexicon, 129A. Read the feature description. Describe the characteristics of the item you selected and the possible dimensions of variation. View the map of how languages are distributed across this feature (bear in mind that the map does not represent all languages of the world, only those that have been investigated). Compose a brief post on how this feature is expressed in the languages of the world. What type of variation can be found? What does it say about universal features across languages?

5.3.4   Summary

-    Typological research and cognitive linguistics share a functional perspective on language. This means that forms are expected to serve certain communicative functions.

- To the extent that languages differ, it can be seen to be variation in how functions map to forms in different way. A function that is grammatically expressed in one language might be expressed lexically in another language.

- Investigating the languages of the world can test hypothesis formulated in a principled manner. For instance, the claim that languages use spatial terms for expressing temporal relations have been contested by studies of languages like Amondawa and Aymara.

- Typological research has found that there are regularities and constraints on variation. To account for these patterns, principles derived from cognitive linguistics can be used to explicate why these regularities appear. One example is the strong tendency of body part terms to develop into spatial markers, which can be seen as derived from the primacy of embodiment.

5.3.5 Review Questions

1. What is an essential universal? Why are typologists usually not interested in such universals?

2. What does grammaticalization mean? Use an example to describe the process.

3. Name a cognitive mechanism to explain diachronic change.

4. Semantic maps can be understood in two different ways. What is the difference between the two?

6   How It All Began: The Acquisition of Language(s) in Childhood

How is it that children can acquire the language of their environment so successfully over the course of only a few years? Is there a difference between the language acquisition process of children and learning a foreign or second language as an adult? On what skills, abilities and mechanisms is the process of childhood language acquisition based? Is this learning process identical to learning other skills during a child's development or can we assume that language development has a special status? Is learning multiple languages in childhood effortless, or is growing up bi- or multilingually a challenge to children? In this chapter, we focus on the basic questions of language acquisition research, to get a feeling for the requirements and learning mechanisms of language students in the classroom.

This chapter is structured into several units. The first, Chapter 6.1, discusses the most important steps in a child's development through the very first phase of life: from the womb to their third birthday. We will illustrate how children acquire their first language through sound development and lexical development. You will see how amazing cognitive, social, and perceptive abilities aid children in their task of learning their environmental language. In Chapter 6.2 we ask the question 'why'. How can we explain the successful acquisition of the environmental language using grammatical structures? By contrasting traditional theoretical explanations with more recent scientific approaches, we want to show how cognitive linguistics contributes to the theoretical debate. Afterwards, we will introduce the solution which usage-based grammar proposes and point out how this theory can explain the acquisition of syntactic constructions. The final section, Chapter 6.3, deals with primary language acquisition in a multilingual context. You will become familiar with the typical steps in the development of simultaneous bilingual children. Finally, we will discuss the possible explanations which various approaches propose.

6.1 Children and Language: The Early Years

Helen Engemann

In the previous chapters, you have received an overview of what constitutes language according to cognitive linguistics. In this chapter, you will see how children unscramble the various aspects of language and what skills they call on to this end. In the first part, we will show, on the basis of sound development, how receptive infant perception is with regard to the linguistic features of their target language(s). The second part of this chapter focuses on how children begin to assign the forms of their L1 language to a certain function and on this basis are able to deduce word meaning. Developmental phenomena and stages will illustrate how even the youngest of children are masters at recognizing patterns.

Study Goals

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

- acquire an awareness of the common and contrasting features of the learning processes of second and first language acquisition
- describe important milestones and phenomena of first language acquisition in the areas of sound development and lexical development
- understand and describe how cognitive, social, and linguistic abilities are connected
- explain testing methods for researching the cognitive and linguistic abilities of small children.

6.1.1 Terminological Tangle: Does a Child 'Acquire' or 'Learn' Languages?

You have probably already noticed how academic literature uses a large variety of different terms to refer to the acquisition of a mother tongue. Some speak of 'language acquisition', others of 'first language acquisition' or 'language development'. Then again somebody drops the general term 'language learning process'. Do these terms refer to different aspects of

acquiring a language? What can this apparent tangle of terminologies be attributed to? The choice of term often depends on the theoretical orientation. In this current chapter, we will shed more light on how followers of nativistic orientations assume that language development depends on innate principles, the so-called universal grammar (UG). According to Noam Chomsky, UG is genetically coded and a feature unique to humans (Chomsky 1959). The principles of UG are, however, only accessible up to a certain age. Representatives of the nativistic approach assume that the limit for learning the grammatical rules of a mother tongue is three to four years of age. According to them, it is only up to this critical cut-off point that language can be acquired. After this point has passed, learners of languages have to fall back on general learning mechanisms. From a nativistic perspective, this explains the insurmountable difficulties that learners of a second language exhibit with respect to syntax. Also, the distinction made between learning and acquiring is a conscious terminological choice based on theory from this perspective. In contrast, cognitive theoretical approaches do not principally distinguish between learning mechanisms based on biological age, as you will learn in Chapter 6.2. Another difference which is implicated by the choice of the terms 'learning' and 'acquisition' is that of instructed learning of a (foreign) language in a classroom situation and that of spontaneous unguided acquisition occurring in a natural setting and taking place mostly without explicit instruction. With L1 languages, it is, therefore, more likely that scholars speak of 'acquisition' rather than 'learning'. But this obviously intuitive distinction is not without its flaws. The language learning process often includes both components. A child that is learning their mother tongue unguided and spontaneously, will acquire explicit knowledge on the structure of languages over the course of their life. In language classes at school, the child will learn standard written language and the grammar rules of their first language. Various studies have shown that literacy development and acquiring the standard written language have a feedback effect on the linguistic processes in the spoken modality (among others, cf. Olson 2002, Ravid/Tolchinsky 2002). On the other hand, the learning of a foreign language in a classroom can be assisted by contact with L1 speakers of that particular language during vacations or language study travels. To proclaim a clear separation of learning and acquisition would be arbitrary from a cognitive linguistic standpoint. Therefore, the various terms regarding language development which you will encounter in this chapter will be used interchangeably.

6.1.2   When Does First Language Acquisition Begin? A Child's First Year

In the following, we will explore the criteria for first language acquisition. The most obvious difference to the acquisition of a second language is quite trivial: the acquisition of the first language begins much earlier: before birth, in a mother's womb. As you can guess, the term 'mother tongue' has emerged not without reason. It is a fact that the foetus is very receptive to auditory stimuli in the third trimester of pregnancy (beginning at the 27th week of pregnancy). The foetus can perceive noises from the external world, even though these are somewhat muffled by the amniotic fluid (cf. Hennon/Hirsh-Pasek/Golinkoff 2000). The foetus' soundscape is comparable to submerging one's head under water in your bath tub. While it is remarkable that the foetus' hearing abilities develop that early, the question is whether it is capable of deducing linguistically relevant features from the sound stream. The reactions of foetuses to various auditory stimuli can be measured with truly ingenious experimental methods. These methods register the heart rate and kicking rate of the child in-utero, which indicate that humans are in fact capable of deducing linguistically relevant features at that age. Foetuses perceive prosodic features, i.e. the typical stress patterns of their mother tongue (such as pitch and tone length) while they are still in the womb. This surprising result was found by the same study (DeCasper/Lecanuet/Busnel/Granier-Deferre/Maugeais 1994) which discovered that foetuses can distinguish between a rhyme which their mother had read to them for a month and a new rhyme as early as the 33rd week of pregnancy. Many other findings support the fact that foetuses and infants are linguistic geniuses. Moon, Cooper & Fifer (1993) found that newborns are already capable of distinguishing their first language from others, if their prosodic patterns differ (such as in English and Spanish). In the experiment, the infants reacted to the unknown language with a higher sucking rate, a rate which was measured with a special pacifier (see Figure 6.1). It is the difference in sucking behavior in response to a visual or auditory stimulus that indicates to researchers that the infant is perceiving something new or unknown. We can see in Figure 6.1 how such an experiment is set up. As soon as the infant is familiar with the new stimuli the sucking rate declines (also cf. Kauschke 2012: 18–22).

Figure 6.1: Illustration of an experiment involving High Amplitude Sucking (Guasti 2002: 23)

Infants are capable of perceiving additional acoustic features in addition to prosodic properties shortly after birth. Findings show that infants are capable of categorical perception as early as the first four weeks of life. This means that they can perceive sound contrasts, i.e. phonemes such as /t/ and /d/ (voiced and voiceless plosives). The perceptive ability is initially very broad: Between the ages of six and eight months, children are able to determine the sound contrasts of all languages. A study conducted by Werker & Tees (1983) involving infants who were growing up with the English language, showed that these infants were capable of distinguishing sound contrasts of a language they had never heard before, Hindi. This ability diminishes drastically over the course of the next few months, as the infant focuses more and more on the phonemic contrasts that are relevant to his or her mother tongue. At the age of ten to twelve months, infants can no longer recognize phonemic differences in foreign languages, just as adults cannot. It seems as if it is the increasing experience with the environmental language which leads to this filtering process. Children learning a language become specialists of exactly the features and contrasts that are relevant to their language. Of course, as a consequence of the filtering process they also become less sensitive to contrasts and distinctions that do not appear in their linguistic environment.

In summary, we can say that a child's initially very broad sound sensitivity becomes more and more language-specific within the first year of life; it adapts to the specific features of their environmental language. This proves the enormous (even prenatal) adaptive capabilities of children and how important interactions with the linguistic environment already are in the earliest stages of language acquisition. It also explains why language learners often have difficulties learning to speak a second language without an accent, which is not a problem in the acquisition of the first language. The adult learner retains only a very limited sensitivity to the sound contrasts of the second language. He or she simply cannot discern many of the critical differences in the sounds of a foreign language and thus finds it very hard to (re)produce them. The perception of a child is calibrated toward the most important features of their mother tongue before they are even born. It is evident that not only speech production (i.e. producing sounds, words, sentences, and speech acts) has to be learned during language acquisition but that the reception of a language (perception and understanding) is equally important.

Apart from the prenatal ability to discern sounds, there is not much going on in terms of language production during the first few months. At this stage, the newborn produces only vegetative sounds – such as sneezing and swallowing – and crying (much to the parents' chagrin) until well beyond the first year. But what is the function of crying for language development? Any person who has been in the proximity of a crying infant knows that the loud wails of the little ones are hard to ignore. The infant is obviously very successful in attracting parents' attention with their cries. In this way, they effectively convey hunger, discontent, or a desire for affection.

Crying, in conclusion, is not only an alarm system that ensures the infant's survival (Klann-Delius 2008: 23-25), it also embodies a pre-linguistic form of communication. Furthermore, studies by Wermke (2008) revealed that there are basic structural patterns (systematic variations in rhythm and melody curves) which underly infant crying. These patterns increase in complexity and are systematically assigned to various communicative functions as the child grows. This is why many researchers view crying as an important precursor of language production and language development in general. The research team around Wermke and her colleagues (Mampe/Friederici/Christophe/Wermke 2009) attained even more remarkable results. They researched the cries of 60 newborns with either German or French as their environmental language. As little as three to five days

after birth it was evident that the intonation patterns adhered to that of the respective mother tongue. The infants exposed to German produced cries with a falling intonation (meaning an initial stress pattern), while the French newborns commonly cried with rising intonations (final stress pattern). We can conclude that infants not only have a gift for recognizing the patterns of their environmental language, they can actually reproduce them in their own sound utterances, practically starting with their first cry.

Over the course of their first year of life, children undergo various phases of sound production (see Klann-Delius 2008). An important milestone is the phase of **babbling**: At about six months of age, babies start to produce sequences of consonants and vowels. You have surely observed small children saying things such as *dada* or *gaga*. This is referred to as canonical or reduplicated babbling, as every syllable (*da* or *ba*) is repeated several times. Children become more adventurous at around nine months of age and begin to produce varying syllable sequences such as *taba* or *gaguda*, called variegated babbling. In this phase, the syllable chains increase in length and the intonation makes it resemble that of actual sentences. Perhaps you have observed children in this phase hold so-called **proto-conversations** with their parents. During this dyadic dialogue between child and parent, the parents respond to the sentence-like babbling their child produces, even though the interaction between the two has no semantic content.

What function then can be attributed to babbling? On the one hand, the child practises their not yet fully developed articulators which include the tongue, lips, and later teeth. On the other hand, it is an approximation of the typical features of the environmental language. Just as for crying, babbling exhibits early consistency with the typical sound features of the target language. Children growing up in a German environment, in consequence, prefer sounds that frequently appear in their mother tongue, such as /t/ and labial sounds such as /m/ (Lleó/El Mogharbel/Prinz 1994). Just like sound perception, sound production exhibits language-specific adaptive processes at an astoundingly early stage.

We now have our first answer to why second language learners do not achieve the same results in language acquisition as first language learners do, and above that, often retain an accent throughout their lives. The linguistic experiences which we gather before birth and as an infant are formative for language development and guide our perception of the properties that are relevant to the target language.

As we will see, this adaptive process is not restricted to the phonetic level but includes form-function-mappings on all abstract levels you have become familiar with in this book. This does not mean, however, that continued learning and relearning are impossible at an advanced age.

6.1.3 The Language Acquisition Path Continues: Acquiring Vocabulary

We've seen in the preceding section how infants in the first year of their life and language development are mainly concerned with the perception and production of sounds relevant to the mother tongue. When does a child begin to associate form and function with each other and thus begins to construct meaning units? The ability of segmenting sound sequences and recognizing phonetic regularities in the environmental language is an important prerequisite for recognizing and filtering forms with semantic meaning, such as words. So how do children make the connection with meaning? This is the question we are going to address in the following section.

Experiment

Quine's rabbit or the 'indeterminacy of reference'

We have learned in an earlier chapter of this book that language consists of form-function mappings on various levels. But have you ever thought about how it is possible that children are capable of attributing certain linguistic forms to the correct meaning in the first place? In other words, how does a child develop concepts and vocabulary? For this purpose, we invite you to participate in a famous thought experiment. It is called 'Quine's paradox' after the American philosopher Willard V. O. Quine: Imagine you are a language researcher who has been sent to a remote island to conduct a field study. Your task is to learn and document the language of the island's inhabitants. While on an expedition with your language informant, you suddenly encounter a strange creature similar to a green rabbit that darts forward from the underbrush. At this moment, your companion turns toward you and utters *gavagai*. It is now your task to determine the meaning of this word. Hypothesize with the other course participants and justify your hypotheses. Now consider how a field researcher would proceed in determining the meaning of the word.

In a more simplified form, the *gavagai* situation can be considered an analogy to the situation of an infant language learner. The child is surrounded by objects and situations and hears a myriad of sounds and words. The problem Quine hints at is the so-called indeterminacy of reference. In other words, how can a child or a researcher know what the word refers to? It is possible that the informant simply referred to the type of animal. But the word could also refer to a specific trait of the creature, such as its color, the texture of its fur, or a behavioral aspect such as its gait. The term could also be a warning, to perhaps call attention to a possible danger emanating from the animal. The word might not even refer to the animal in any way. Perhaps the word applies to a completely different aspect of the situation that has escaped the researcher's notice because (s)he was distracted by the unusual animal.

So how is it possible that a child begins to produce their first words at roughly one year of age and is capable of understanding several words at only a few months of age? There are several conditions which are necessary for arriving at word meaning. The first condition is that the child has discovered that linguistic utterances are intentional, meaning that they are produced with the intent to refer to something. The second condition is one that you have already become acquainted with in the previous section: The child needs to be capable of segmenting the sound stream and of attributing meaning to the segments they have identified, i.e. to connect them with people, objects, and events. During this learning process, the child receives considerably more help than the poor language researcher in the *gavagai* experiment. The situation that Quine has construed is not particularly realistic. Words do not simply emerge from a vacuum as he suggests, but appear in the context of social interactions which provide important clues. Visual cues such as the interlocutor's gestures, facial expressions, and eye-movement all help to deduce semantic meaning, as does shared background knowledge, the so-called **common ground**.

The child develops important socio-cognitive abilities in the first few months and years of their life. These help the child perceive and use the clues which socio-interactive context offers. Socio-cognitive abilities play a significant role for lexical acquisition. The ability of so-called **joint attention** is an important milestone for lexical acquisition. Around the age of eight to twelve months, the child develops the ability to purposefully follow the eye gaze and pointing gestures of interlocutors (Tomasello/Carpenter 2011). With that, the child is capable of directing their attention to

the same objects as the communicative partner. There are two important aspects to joint attention: one, a shared focus of attention and two, that both participants are aware that the other is mentally picturing the same information. According to Tomasello (2001) such a **triadic interaction** between child, adult, and the object in the shared focus of attention is the cornerstone of meaning acquisition. Reading picture books together is an example of a typical situation of triadic interaction: the attention of the interactive partner reading aloud to the child and the attention of the child are focused on the book. At the same time, the child understands that the utterances of the reader are related to the contexts and objects presented in the book. The child can, therefore, establish links between what is said and the object in the focus of attention and thus make first rudimentary mappings between form and function. It shows what an important condition the ability of social interaction is for lexical acquisition.

Figure 6.2: Example of a triadic interaction (Katsiaryna EL-Bouz)

Over the course of their first few years, the child acquires additional and equally important socio-cognitive abilities which facilitate the learning of word meaning. They learn to 'read' the intentions of their interactive partners, which is why this ability is called **intention reading**. Children can

detect the intention behind the action of a person by the age of two or three. But why is discerning intent so important for learning words? A study by Tomasello & Barton (1994) convincingly illustrates the connection between the two: In an experiment, children aged 24 months were assigned the task of finding an object referred to by the nonce word *toma* together with the experimenter. The experimenter looks into five containers which contain one object each. She assumes a disappointed expression when looking into four out of the five containers but reacts excitedly when looking into one of them and discontinues the search. Afterwards, the children assigned the correct term to the reference object, even though the object and the term were never introduced directly in connection with each other. Hence, the children must have used other clues, such as the emotional reaction and the behavior of the experimenter to deduce that her operational intent, finding the *toma,* had been achieved. Recognizing intent in dialogue partners helps children to create form-function mappings. With the ability of intention reading, even toddlers can understand that the linguistic utterances of a communicative partner are meant to refer to something in the shared focus of attention.

What makes children produce their first words? Deb Roy and his team asked this question in their unusual research project, the "Human Speechome Project" (Roy 2009, Roy/Frank/Roy 2012). In this very innovative study, the expecting father Deb Roy installed cameras and recording devices in the ceiling of every room in his house to enable a seamless recording of the first three years of his son's life. In the name of science, Deb Roy and his family subjected themselves to a three-year long version of *Big Brother.* Based on these substantial recordings, Roy and his team were able to conduct complex analyses of language and movement. The goal was to research in what ways his son's language development was connected to various spatial and temporal environmental factors. The results show that the acquisition of word meaning is indeed strongly context-bound and directly connected to certain social routines (so-called **scripts**). These include routines such as getting dressed, washing up, or eating together. This means that by associating certain procedures with different components belonging to the routine, children form conceptual knowledge that goes beyond word meaning. An additional important result was that the production of a child's first word is often encouraged and supported by the adult's preceding linguistic utterances. Before the child produces their first word for the first time, the same word occurs more frequently in the

adults' input, often in very short and simplified sentences. Parents facilitate their children's language acquisition task by using the features of child directed speech (CDS) (more on CDS in Chapter 6.2), thereby optimally encouraging 'the birth of a word'.

Figure 6.3: The "Human Speechome Project" (Roy 2009)

Do you know what your first word was? The utterance of the first word is very meaningful in many cultures. Parents greatly anticipate their off-

spring's first words and often proudly document them. Are these first words completely individual or are there general tendencies? Comparative linguistic studies that have researched the first utterances of children with different target languages have found that children talk about very similar things in the beginning; independently from their cultural environment. The most common first words, unsurprisingly, reflect the things which are most important in an infant's daily life. They name the key caregivers (*mummy, daddy*) or objects such as toys that capture baby's particular interest (*ball, teddy*). Many words are of a socio-pragmatic nature (*no, yes, thank you, hello, good-bye*) or express activities and the associated requests in verbs and particles, such as *eat, up, down.* Frequently appearing words are *more* and *again*. These are often used by the child as requests when they want more of something or wish to repeat an action. These first utterances are unmistakeable expressions of what motivates children to utter their first words: to socially interact with the environment as well as voicing and enforcing their needs. Many children experience a strong acceleration in their lexical development after acquiring their first 50 words, around the age of 18 months. Their productive vocabulary may often grow by several words daily, which is why this phase is called **vocabulary spurt**. Word use during the first few years of a child's life is typically characterized by **under-** and **overgeneralizations**. Undergeneralizations occur when a child uses a general term to only denote a subcategory, or a certain representative of a category. For example, a child accepts the terms *trousers* only when referring to *jeans* but protests when the word is applied to *corduroy trousers*. Similarly, *plate* may only be an accepted designation for the personal favourite pink plate. In this scenario, the term practically has the function of a proper name. Overgeneralizations are the case when a child overstretches a term's actual scope of meaning. This commonly happens on the basis of a certain feature, which the child perceives as especially characteristic. For example, the child has learned the word *ball* and proceeds to apply it to everything which is more or less round (*slice of sausage, tomato, egg, eye, moon*). Hence, the child has determined a similarity between the objects on the basis of a certain perceptual dimension. These similarities need not necessarily be visual features. A child could as easily call a vacuum cleaner a *train* due to the similar sounds these two objects produce (cf. Szagun 2013). What conclusions can be drawn from over- and undergeneralizations in terms of the learning process and meaning acquisition? There is actually no consensus on how to interpret word

usage of this kind. They could reflect a not yet fully-fledged concept, which the child construes at the time of utterance and which does not yet fully correspond to an adult's concept. This interpretation would mean that the word *ball* at the time of the overgeneralization has the meaning of a 'more or less round object' to the child. It could also be the case that overgeneralization is merely a compensatory strategy: the child is aware that an egg is not a *ball*, but *egg* not yet being a part of their productive vocabulary, they use the term *ball* symbolically as a communicative gap filler.

In any case, the above examples suggest that children orient themselves towards a prototypical meaning structure such as the one introduced in Chapter 3.2. Individual features of an object or certain representatives of a class are perceived as central and form the baseline for a category (cf. Bowerman 1977). The more experience the child gains by comparing similar and different objects and by comparing representatives of the same category, the more elaborate the concept behind the word becomes. In the same fashion, children's use of overgeneralization in early word use shows their ability to perceive similarities and to create categories by analogy. These abilities also play a decisive role for learning grammatical constructions, as we will find out in the following chapter.

6.1.4   Summary

- Infants communicate pre-linguistically by means such as crying. They even possess a prenatal sensitivity for the acoustic features of their environmental language.
- Their early language perception abilities allow infants to recognize and reproduce the patterns of their mother tongue. This is evident in the fact that their first vocalizations (such as crying and babbling) are characterized by the features of their mother tongue.
- The important development of socio-cognitive abilities in the first two years of life allows children to draw conclusions regarding the meaning of linguistic forms and is a precursor to lexical acquisition.
- A child's first words appear in heavily contextualized routines and are based on the linguistic utterances of the parents.
- Children's word use during the first two years of life exhibits certain typical features which give us insights into the formation of categories and analogies during the language learning process.

6.1.5   Review Questions

1.   When does language acquisition begin and how are early linguistic perceptive abilities tested?

2.   How do the language-specific patterns of the environment influence acquisition?

3.   What are the phases of sound production in a child's first year? What is characteristic of the respective phases?

4.   What are milestones of a child's socio-cognitive development during the first few years of life? How do they relate to lexical acquisition?

5.   What is characteristic of word usage during the first few years of life? Name examples of your own choice.

6.2   How Children Create Constructions

Helen Engemann

In the last chapter, you have become familiar with the beginnings of language acquisition up to the emergence of first words. With that, children have acquired important building blocks for their linguistic abilities. How do children now learn to combine these building blocks according to the syntactic patterns of their target language? How can we explain the successful acquisition of complex constructions such as passive constructions or relative clauses? With these central questions of language acquisition research in mind, we begin this chapter by presenting the abilities a child utilizes when beginning to implement grammatical structures. Afterwards, we will sketch out characteristic developmental stages of construction acquisition for German L1 acquisition; we will use typical German multi-word utterances as examples. The second part of the chapter will revolve around the question of 'why'. We will compare various approaches of fundamental language acquisition theories which still influence modern language acquisition research today: nativism and constructivism (see Chapter 4.1 for an overview). When comparing the two theories, the main questions that arise are 'What is the role of the linguistic environment the child is exposed to?', 'What abilities and prerequisites must a child possess to master the task of acquisition?', and 'What are the learning mechanisms that are relevant to language acquisition?'. In the last part of this chapter, we discuss a current constructivist model which unites various aspects of seminal theoretical currents: so-called usage-based linguistics. Usage-based linguistics has established itself as a successful alternative to traditional approaches. By using the acquisition data of various grammatical constructions, we will show how the usage-based approach contributes to explaining the acquisition of grammar.

Study Goals

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

  –   sketch out the characteristic steps of learning constructions

- critically discuss the various approaches to language acquisition research and distinguish them from one another
- present the different roles of the linguistic environment (input) as well as genetic predisposition for seminal theories of acquisition
- explain the learning mechanisms of the usage-based approach on the basis of construction acquisition.

6.2.1 Accessing Syntax: Receptive Abilities

Learning to use the constructions of your first language is one of the most astounding achievements of childhood development. It is not surprising, therefore, that syntax receives a great deal of attention in language acquisition research. Despite the wide variety of syntactic patterns many languages have to offer, children are usually able to master and reproduce the basic constructions of their mother tongue by the age of four. Many say this happens completely effortlessly, without any errors and without any instruction whatsoever. We will see in this chapter to what extent this might be true. What can be said for sure, is that children do not learn the syntactic rules of their first language by being explicitly taught these structures, like a mature student would learn a foreign language. Parents do not give their 'little ones' lessons in grammar. Utterances which do not conform to the target language are rarely corrected explicitly, and if they are, only unsystematically. Even when an adult caregiver makes a correction, it is unclear if and to what extent children absorb them and use them in language acquisition, as you can see in Figure 6.4.

Figure 6.4: Explicit corrections (Lightbown/Spada 2013: 18)

A language acquisition theory has to be able to explain how children are able to actively and correctly use their mother tongue's syntactic patterns at only four years of age – despite the complexity of the task and a lack of explicit instruction. But let us start at the beginning: in order to get a foothold in a language, a child's first task is to recognize the elements in a continuous speech stream which together form syntactic units, for instance the constituents of noun and verb phrases: ([*The cute little chubby dog*]$_{NP}$ [*has eaten the bone*]$_{VP}$) and those which supply grammatical information such as function words (articles, conjunctions, inflectional endings). As they begin to grasp syntax, children make use of their perceptive abilities and the typical characteristics of child-directed speech (see Chapter 6.1). Research has shown that even before they are capable of producing two-word utterances themselves, children can filter out syntactic units from input (cf. Schröder/Höhle 2011, Weissenborn 2000). This is possible through a sensitivity to the prosodic features of the sound stream which partially exists before birth. These prosodic features (see Chapter 6.1) such as speech rhythms, stress, and speech pauses correlate with syntactic information. Changes in prosodic patterns often mark the boundaries of syntactic units within the speech stream. An example are the short pauses that can be acoustically measured before a verb phrase or at the end of a sentence. The findings of Jusczyk and his colleagues (1992) show that children as young as nine months recognize the cues that mark the boundaries

of syntactic phrase boundaries (such as [*Did she*] # [*drink the milk*]? with a pause (#) between subject and verb) that appear in the speech stream. Children can use these cues to parse the speech stream into relevant syntactic units such as words, phrases, and sentences. Deducing syntactic knowledge via prosodic cues is also called **prosodic bootstrapping** (Höhle 2005). The child additionally receives support from the parents, who unconsciously adjust their language (CDS) so that the aforementioned prosodic cues are especially prominent: their pauses are especially long, and the stress patterns are more prominent when parents communicate with their children. Hence, the language offered by their caregivers helps children recognize syntactically relevant phrase and word boundaries (Kauschke 2012, Szagun 2013). In addition to the early sensitivity for prosodic cues, children develop social and cognitive abilities for recognizing patterns and for creating analogies. These are important requirements for constructing a grammar. We will reflect further on these requirements over the course of the next chapter.

6.2.2   Acquisition: The Most Important Steps

How does syntactic acquisition proceed in terms of a child actively producing constructions? What is characteristic of a child's first multi-word utterances? Studies conducted in different languages indicate a close connection between the size of a child's vocabulary and the production of his or her first two-word utterances (Bates/Goodman 2001). Only when the 'critical mass' of 50 words has been acquired, children typically begin to combine them into short two-word utterances and begin to form their first syntactic structures, especially structures with inflectional endings. The results of Marchman & Bates' (1994) study show that English children only begin to tap into the past tense after acquiring a critical mass of verbs that can be used for comparisons.

Children's first few word combinations exhibit several typical features which recur in the language acquisition data gathered in several cultures. Content words are strung together in such a way that the relation between the individual words can only be deduced by the interlocutor in context. The child's utterance *mummy teddy* could be interpreted as a demand directed at the mother (*Give me the teddy*) or as a comment (*Look, a teddy*!) or as a question (*Where is the teddy?*). Function words such as articles or

conjunctions are usually completely absent (*want ball*), as are subjects or verbs (*ball red*).

As far as word order and especially verb positions are concerned, data on German acquisition exhibits several tendencies and developmental stages. These have been empirically substantiated, despite great variation on an individual level in terms of beginning and rate of acquisition (Szagun 2013, Tracy 2007). One challenge during acquiring construction stems from the asymmetrical verb positioning in German main and subordinate clauses. While the inflected verb stands in the verb second position (V2) in main clauses, it appears in verb-initial position (V1) in yes-no questions (*Ist der Papa da?* (Is Daddy home?)), and in verb-final position (VF) in subordinate clauses. We must also consider that complex verb forms are frequently found in German, such as the combination of modal and main verb (*er will Kekse essen/*he wants to eat cookies) or the perfect construction (*er hat Kekse gegessen* (he has eaten cookies)) with a content bearing main verb in infinitival form in sentence-final position (as a participle or an infinitive). As you have just seen, the position of the verb is closely connected to its morphological form. Do these correlations and asymmetries in syntactic structure resurface in the utterances of children acquiring German? Researchers have frequently observed that multi-word utterances of children between the ages of 18 months and two years often initially utilize the uninflected form of a verb in the final position of a clause (either as an infinitive or as a participle). This characteristic non-finite phase is illustrated in the following utterances of the nearly two-year-old Simone (cf. Behrens/Pfänder 2013: 329):

(1) *Teller ham* (literally: plate have)

(2) *(ka)putt dedange* (= *gegangen*) *Schaukel.* (literally: swing broken)

How can we explain the existence of this non-finite phase during language acquisition? Utterances such as in the above examples could be a reflection of the aforementioned frequent complex verb forms (*Kannst du das nehmen?*/Can you take that?) in the input, which provide children with ample evidence of uninflected verbs in sentence-final positions (Behrens 2011). Perceptual factors could also explain children's initial use of infinite verbs. The main verb is in the sentence-final positions such as *Er will den Keks essen* (He wants to eat the cookie) and in questions directed at children such as *Willst du mit dem Ball spielen?* (Do you want to play with the ball?). In this way, the content-bearing verb often receives a stronger emphasis

than the auxiliary verb in its position at the beginning of a sentence (Behrens 2003). Children also tend to pay more attention to the final position in a sentence, which also plays a role in their stronger awareness of main verbs (Slobin 1985). As the information last heard in a sentence, main verbs are more likely to be absorbed by the still limited processing capacities of a child's working memory (see Freudenthal/Pine/Aguado-Orea/Gobet 2007). Tomasello (2000b) goes a step further by rating the infant use of non-finite verb forms such as in *open it* as truncated imitations of input from an adult's utterance (*me open it* instead of *let me open it*) and the consequence of a still limited capacity for intake and processing. Similarly, Szagun (2013) interprets infant use of non-finite verb forms as truncated input strings from adult utterances which lack the auxiliary and modal verbs of multi-part verb forms.

Children experience an important additional developmental stage between the ages of 18 and 28 months. As shown in (3) and (4), children begin to produce inflected verbs during this stage. It is notable how the typical verb position in German main clauses (in verb-second position) is almost always adhered to from the beginning (Tracy 2007). Learning verb inflection and the V2 position in main clauses characteristically take place at the same time.

(3)   *der beißt* (he bites)

(4)   *die baden* (they are bathing)

<div align="right">(Szagun 2013: 82)</div>

This very notable adherence to the verb positions of the target language is also followed in the production of subordinate clauses, which are usually first produced between the ages of two and a half and three years. Children usually place the inflected verb (underlined in the examples below) with great accuracy in the sentence-final position where one would expect to find it.

(5)   *die puppe lacht immer, wenn de hilde <u>kommt</u>* (The doll always laughs when Hilde <u>comes</u>).

(6)   *das bewegt sich heute so, weil's kaputt <u>ist</u>* (That moves like that today, because it <u>is</u> broken).

<div align="right">(Stern/Stern 1928)</div>

A peculiarity of early childhood subordinate clause structures is the frequent absence of elements introducing subordinate clauses (conjunctions

or relative pronouns). This is apparent in utterance (7), which was produced by a three-year-old child.

(7) *Du solls die mama sang ich immer einen unfall <u>mach</u>* (You should tell mum I always <u>make</u> an accident).

<div align="right">(Rothweiler 2002)</div>

By the age of about three or four years, a child has mastered the most common sentence structures in German. However, the diverse word order patterns in German need to be acquired one step at a time. This is the case for syntactic rules that place the object in the first position, such as *Den Keks hat er gegessen* (That cookie he ate) and the subtle stylistic and semantic changes that these structures entail. With respect to multi-word utterances between the ages of 18 months and three and a half years, we see that children easily succeed in recognizing and producing the essential word order patterns and regularities their language offers over a short period of time. Deviations and especially errors children make during this time tell us much about which regularities they have already identified.

6.2.3 Explanatory Approaches

The acquisition process of the various sentence patterns is well documented. But how can the rapid, robust, and mostly error-free process be explained theoretically? What are the learning mechanisms that impact the acquisition sequence of the non-finite and finite phase? How is it that verb positioning in subordinate clauses often matches the target language from the very beginning? These are the controversial questions which spark very different opinions and controversy in language acquisition research. To this day, there is no consensus between the different theoretical schools. In this section, we will introduce two of the most frequently discussed theoretical approaches to and perspectives on acquisition. We will begin with Chomsky's nativist approach which arose from a traditionally structuralist view on language and considered itself a reaction to **behaviorism** (see below). Afterwards, we will introduce a relatively new alternative model, Michael Tomasello's approach to **usage-based grammar** (Tomasello 2000a, 2003). A fundamental difference between the two approaches is the question of whether children are born with the abstract knowledge of syntactic regularities, i.e. whether it is an innate endowment (**nativism**) or whether the regularities are acquired bit by bit through the interaction with the environmental language(s) in a progressive generalization process (**construc-**

tivism). You are probably aware of the well-known debate on the influence of genetic disposition versus environment (nature – nurture) which permeates many other fields. It is a debate that has also made its entry into linguistics.

6.2.3.1 Nativism: Language Acquisition as a Logical Problem

The starting point of Noam Chomsky's nativist (instead of nativism, the term **generativism** is also commonly used) theoretical approach was a publication (*Verbal Behavior*) by the psychologist Burrhus F. Skinner (1957). Skinner conceived of language acquisition purely behavioristically as a stimulus-response pattern: he viewed language as a conditioned behavior, which children learn solely by imitating parental utterances with the aid of positive and negative reinforcement. According to this model, the child is conditioned by the responses to correct linguistic utterances (positive reinforcement) or errors (corrections: negative reinforcement). Bit by bit, the child's language converges with the model of the environmental language. When viewed from this perspective, the learning process underlying language acquisition is a stimulus-response pattern: The child hears a linguistic cue in the environmental language and reacts to it by imitating the offered cue. His or her surroundings react with either positive or negative reinforcement to the infant utterances. In the same vein, syntactic abilities are explained as an associative process of linking words, which gradually stabilizes and becomes a speech habit by positive reinforcement. If language acquisition were to be truly reduced to a conditioning mechanism, then successful language development would be explained in the same way as the conditioned drool reflex of Pavlov's dog (see Figure 6.5), who happily associates the ringing of a bell with food.
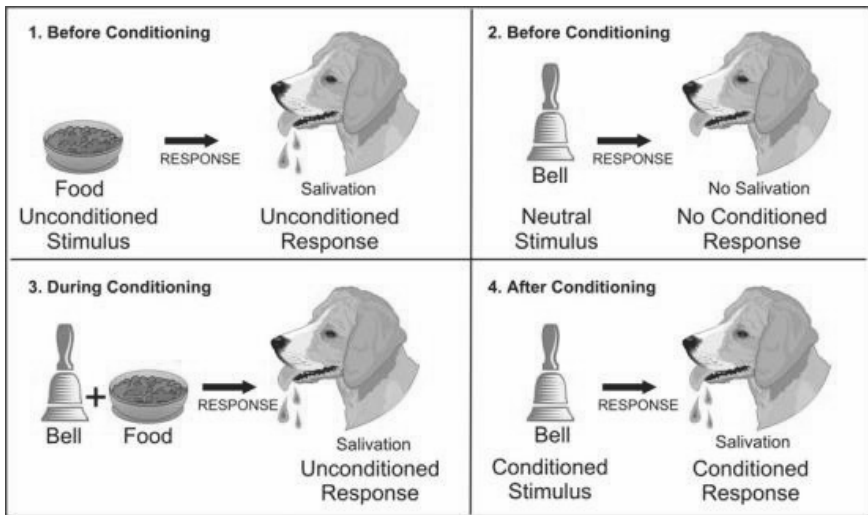
Figure 6.5: Classical conditioning: the example of Pavlov's dog (ephipp 2014)

Noam Chomsky took a vehement stand against this view in his review of Skinner's *Verbal Behavior* (Chomsky 1959). The input of the environmental language is not sufficient, in Chomsky's opinion, to explain why children can use language creatively. Creativity in this case means that the necessarily limited rules of language can be used to produce a theoretically unlimited number of utterances. That this cannot be only due to mere imitation of the input language(s) is seen in the fact that children's utterance often strongly diverge from the adult's input, says Chomsky. Overgeneralizations such as *I swimmed*, which young children typically produce, cannot be attributed to imitations of adult speakers' input. Hence, infant utterances go beyond the input of the environmental language. According to Chomsky and other advocates of nativism, the rapid acquisition of syntax, when considering the input available to the child, presents us with a logical problem: The input is quantitatively and qualitatively insufficient for a child to gain the necessary knowledge of rules on this basis alone. In summary, the anti-behaviorist argument is known today by the term of **poverty of the stimulus** and encompasses several aspects. Firstly, the input a child is exposed to is necessarily limited, meaning to say that it can only include a portion of the utterances possible on principle. Secondly, proponents of nativism view the input as qualitatively restricted because spoken language, including the language produced by adults, is often full of errors, slips, and

incomplete sentences. Therefore, nativists conclude, it should not be possible for a child to derive linguistic rules and laws from his or her environmental language, due to the qualitative and quantitative deficits of the language data available.

So, what do nativists propose as a solution to the logical problem of language acquisition? According to Chomsky and other representatives of nativism, the solution lies in the inherent language-specific endowment children possess. This endowment dictates the blueprint for acquiring syntax. From a nativist perspective, this explains why children do not make all the errors which are theoretically possible. For instance, verbs do not appear in every possible position in the sentences of children's utterances but instead display clear tendencies (see above). This is due to the limitations of universal grammar (see Chapter 6.1), according to the nativist view.

From this perspective, possible structures of the language system are limited by the inherent principles of universal grammar and restrict what hypotheses can be made. This in turn would also explain how acquisition can proceed so rapidly and following similar developmental stages across different languages. The genetic endowment matures, as any other organ of the human body, according to a genetically preprogramed plan: "Language acquisition seems much like the growth of organs generally; it is something that happens to the child, not that the child does" (Chomsky 2000: 7).

Deviations in infant utterances result in part from the biological maturation process which linguistic competences are subject to, in part from a complex activation process. Different areas of grammar are activated in hierarchical steps and within certain time windows. The linguistic input a child hears plays only a secondary role as a trigger. When the child recognizes certain features of the target language in the input, such as verb position, it triggers a **parameter setting**. This is a strictly nativist approach known today as the **principles and parameter model** of language acquisition: innate features referred to as principles are common to all languages, i.e. do not have to be acquired by the child. The so-called parameters on the other hand are language-specific features which represent possible realizations of a universal principle. These have to be set in the course of language development. An example of a cross-linguistically universal principle would be the knowledge of how words can be combined to form new structural units (such as *Paul's blue ball*). Language-specific parameters determine which position an element may occupy. In French, the modifying

elements appear in a different position (*le ballon bleu de Paul*) than in English (*Paul's blue ball*).

According to nativism, setting the particular regularities ('parameters') of a language is the mechanism that underlies language acquisition, which proceeds in a stepwise fashion and is biologically determined. The range of variation is also specified by universal grammar. A wide variety of theoretical currents still exists within nativism today. These mainly differ in terms of the abilities that are considered innate. Whereas the traditional principles and parameter model focuses on innate knowledge of grammatical structures, other proponents focus on innate mechanisms and processes which enable a child to efficiently process a language and sift through the input for significant information (cf. Hirsh-Pasek/Golinkoff 1996). Nativist approaches have in common that the process of acquisition is seen as top-down. This means that children infer the syntactic patterns of their target language on the basis of the abstract knowledge (be it form of structural knowledge or restrictions in learnability) they are endowed with. Hence, it is a deductive process: the innate knowledge of rules predetermines specifically how language data is approached. Children use the input to compare these structures with the hypotheses they have access to and 'adjust' them to the target grammar via the appropriate parameters (see Chapter 4.1).

6.2.3.2   Paradigm Change

What are the empirical findings in terms of nativist assumptions? Is there really any evidence for a genetic endowment for linguistic abilities? The discovery of the so-called FOXP2 gene (Lai/Fisher/Hurst/Vargha-Khadem/Monaco 2001) caused a stir among linguists several years ago. This genetic mutation was associated with pronounced speech disorders which appeared in three generations of one family. All members who carried the mutation were affected by the speech disorder. The discovery was prematurely considered as proof of a 'language gene' which controlled the development of linguistic abilities. Further studies cast doubt on this interpretation, as the same gene was found in song birds and primates. It was also found that FOXP2 affects non-linguistic abilities, which manifested themselves in anomalies in non-verbal intelligence and motor control processes (Watkins/Dronkers/Vargha-Khadem 2002). Therefore, syntactic

abilities and their impairment cannot be directly ascribed to the FOXP2 gene.

Nativist arguments also came under fire in the last two decades due to empirical findings. Especially the poverty of the stimulus argument could not be substantiated empirically: numerous studies on acquisition scrutinized input via corpus analyses (cf. Behrens 2006, MacWhinney 2004, Tomasello 2003) and found that linguistic input is not as impoverished as Chomsky and his colleagues assumed. Statistical corpus analyses of child-directed speech showed that the input is a quantitatively and qualitatively rich source of data for language acquisition. A computational linguistic study conducted by Sagae and his colleagues (2004) examined parent-child interactions in several linguistic corpora and found that parental child-directed speech – in opposition to Chomsky's assumptions – is marked by a high degree of error-free language use, comparable to the corpora of the *Wall Street Journal*. Similarly, the claim of 'impoverished' input cannot be maintained from a quantitative perspective: Behrens' (2006) analyses of child-directed speech showed that children are exposed, on average, to several thousand mostly well-formed utterances a day. Thus, the 'logical' (as nativism deems it) problem is empirically invalid: the vast number of mostly well-formed linguistic utterances and grammatical structures children are exposed to over the years provide more than enough guidance for an effective learning process; even without assuming the existence of pre-existing linguistic knowledge.

From the theoretical side, more and more objections are accumulating against nativist arguments: the central concern is the fact that nativist explanatory models are restricted to highly abstract grammar rules. Abstract rules cannot explain the knowledge of constructions and collocations, even though they are also a large part of linguistic knowledge. They are often excluded in nativist theories as lexical knowledge, which has to be acquired independently from core grammar with other learning mechanisms. This means that a two-part learning process would be necessary to sufficiently explain linguistic competence. The assumption of innate linguistic knowledge, therefore, only serves as an explanation for part of the problem and overall leads to a possibly redundant and unnecessarily complicated two-part theory. From a theoretical standpoint, a learning model that can explain grammatical and lexical knowledge through a single process is preferable:

a usage-based approach is ultimately more parsimonious than a UG approach: First, it does not require a separate innate endowment just for the purpose of language. Moreover, the same mechanisms will account for the acquisition of all of language, i.e., one does not assume separate learning mechanisms like triggering or maturation that solely serve the purpose of activating and setting the language-specific parameters of UG. (Behrens 2009: 390)

A series of explanatory models have developed over the last 20 years as alternatives to the nativist approach. These are able to show empirically how language acquisition and especially the acquisition of complex syntactic structures can work without needing to fall back on innate knowledge. We will introduce usage-based grammar in this section, which is a strong constructivist standpoint that opposes the nativist model. Usage-based grammar is based on the premises of construction grammar, which you have become familiar with in Chapter 4.

6.2.3.3   Constructivism: Usage-Based Language Acquisition Theories

The starting point of usage-based theories (see Behrens 2011, Tomasello 2003) is a construction grammar perspective on language (see Chapter 4). Explaining language phenomena is not reduced to competences of core grammar but encompasses all constructions, for instance form-function units at all levels of abstraction and complexity. Language use plays a key role for acquisition, in other words the linguistic input a child is exposed to. According to proponents of the construction grammar approach, it is possible for a child to build up syntactic knowledge inductively on the basis of rich input, i.e. on the basis of individual linguistic utterances. Children do not conjecture from abstract prior knowledge, but from concrete utterances from the input. On this basis, children accumulate the groundworks of their knowledge on constructions in a piecemeal fashion:

> […] children do not experience constructions but only utterances; they must (re-)construct for themselves the constructions of their

language from the individual utterances they experience. (Ibbotson/Tomasello 2009: 60)

In this approach, the knowledge of the rules and regularities of language is not innate but deduced from language use in a gradual process of generalization (also see Chapter 3.3 in Volume *Language Learning and Cognition*). No amount of language-specific prior knowledge is necessary. The child utilizes a series of general cognitive and social abilities which we have discussed earlier in Chapter 6.1: the abilities of **pattern finding** and **forming analogies** are central and are also at the root of typical overgeneralizations in early word use (see Chapter 6.1). Children are capable of recognizing similarities and differences at an early stage, as well as being able to form categories and generalizations. An example of a typical child error of overgeneralizing is applying regular past tense verb endings to irregular verbs (*he taked* instead of *he took*). It is an indicator that the child has recognized some common endings of many participles (*–ed* as in *walked*) as a pattern and subsequently abstracted and actively reapplied it to new contexts. We have seen in the last chapter that children possess statistical sensitivities in terms of the distribution and frequency of sounds, words, and structures in the input at a very early age.

How does the learning process proceed from a usage-based perspective? Children need to traverse three stages when extrapolating abstract constructions from input (cf. Madlener/Behrens 2015): First, children unconsciously analyze frequency distributions in the input. Children filter out so-called **chunks** (Lieven/Behrens/Speares/Tomasello 2003) which are especially frequent form-function units that appear in the input. These are unanalyzed and formula-like set pieces which are stored in memory holistically, that is, without analyzing the individual elements of the construction. Such a chunk could be the multi-word sequence *What's that?* which the child might have heard repeatedly when reading picture books in triadic interactions (see Chapter 6.1). Children imitate the form-function units they filter out of the speech stream in their own utterances and thereby further consolidate them. Chunks stored in memory in this fashion are easily retrievable and form the starting point of the budding generalization process. It is important that the chunks have no abstract status at all in the beginning. These are also referred to as **item-based constructions** and are the first child representatives of constructions. Item-based constructions means that the constructions are directly adopted from the concrete utterance in the

input and in its initial use is only used in that exact order by the child. It explains why the word order of the first child utterances often conforms to the target language: They are directly adopted from the heard input. The initially item-based constructions are analyzed in their parts by the child at a later point. But a second step is necessary, referred to as the formation of schemas. Children slowly detach themselves from concrete individual copies when they have stored a critical mass of chunks. By comparing the various form-function units, children recognize similarities and differences, thereby abstracting their first patterns, also known as schemas. The **verb island hypothesis** (Tomasello 2003) plays a central role. It is the hypothesis that the patterns a child recognizes are usually grouped around verbs and their argument structure. Verbs are the anchor points, and the initial use of constructions is closely connected to verb islands. For instance, based on the chunk *What is that?* a child has acquired the schema [X IS Y]. The initially fixed unit has thus reached a higher level of abstraction. The child has recognized that the verb *is* can variably stand between other words, such as *That is a camel* or *Who is Peter?* The first few uses of construction patterns are still directly tied to the verb of the utterance it was heard in. At first, the child is not able to transfer the construction pattern to other verbs. So, the schema [X IS Y] is only applied to the specific verb *is* and only in that specific morphological form (third person singular). A transfer to other forms such as *What are cookies?, Who are you?* is not possible at this stage. In other words, jumping from one verb island to the next is not possible or only in a limited capacity. It is only during a third step of the learning process that children gradually create connections between islands.

The third step in the process is **generalization**. Children recognize the regularities of schemas they have already acquired and further generalize them. It is then that schemas have reached the status of abstract syntactic knowledge. Children can now utilize the acquired constructions flexibly in various contexts and in combination with different lexical elements. It is precisely this feature which makes constructions so productive. In contrast to chunks, children can now use the construction independently from the original context and with other verbs and lexical units. With respect to our earlier examples, the form of the abstracted construction after the third step is [X COPULA Y]. These abstract constructions would now enable the child to produce utterances such as *The food is delicious* or *His name is George.* This goes far beyond the initially stored chunks.

The verb island hypothesis is empirically supported by several experimental studies on the use of nonce verbs. Tomasello and Brooks (1998) presented children with nonce verbs while they were playing. These nonce verbs were used either in a transitive or intransitive construction schema (*The dog is tamming the apple* versus *The dog is tamming*). When questioning the children subsequently, the researcher attempted to elicit the use of the new verb. The results were that children below the age of three almost exclusively used the new verbs with the syntactic pattern that had been utilized to introduce the verb to them. Verbs presented as transitive were adopted by the children as transitive and were rarely used intransitively. However, with increasing age, children generalized the new verbs to include other construction types. 90 % of the five-year-old children were able to transfer the new verb to both construction schemas. The results of the study indicated that in the beginning, constructions are strongly tied to the concrete lexical units with which they appear in the input. Due to a lack of abstraction, they cannot yet be transferred to other verbs. The initially island-like construction slowly detaches from their concrete lexical-verbal context and expands to include other lexical contexts in a gradual generalization process. The central finding of the study was that children's use of constructions is not initially based on an abstract knowledge of rules, as one would otherwise expect the ability to transfer to other lexical contexts. The process of acquiring syntax is, therefore, bottom-up: As part of a gradual generalization process, children slowly accumulate knowledge of structural rules on the basis of concrete individual utterances in the input. Abstract knowledge is the final product of this generalization process, not the starting point.

A theoretical benefit of the usage-based explanatory approach is that it does not assume two different learning mechanisms for children and adults. The acquisition of the first and second language is based on the same cognitive abilities of recognizing and generalizing patterns. The differences in the learning process and its different outcomes stems from the different conditions in terms of processing capacity and memory storage, which are still limited for children.

6.2.4 Summary

- Children have a sensitivity for prosodic cues at an early stage, which they utilize when learning constructions. Being able to

recognize pauses in the speech stream makes it easier to filter out units that belong together syntactically.

- Children acquiring German as their first language passing through several stages of acquisition during first language acquisition. During this time, verbs which are initially used in their non-finite form and are placed in sentence-final positions in German are used in the correct position and in their finite form at the age of about two years.

- Nativist acquisition theories explain syntax acquisition as a top-down process by assuming the existence of inherent language-specific knowledge which is activated by a biological maturation process and through interaction with the input.

- According to usage-based constructivist approaches, the child construes syntactic knowledge only gradually. This takes place in a bottom-up process on the basis of input and general cognitive abilities (pattern recognition, forming analogies, generalization).

6.2.5   Review Questions

1. What are the most important stages of acquiring basic German sentence structures in first language acquisition?

2. How does the nativist theoretical approach explain the acquisition of grammatical competence?

3. Which arguments oppose the nativist approach?

4. What are the central concepts which form the basis of the usage-based approach?

5. Which learning mechanism underlies language acquisition from a usage-based perspective?

6.3 Early Child Multilingualism

Helen Engemann

In the preceding chapters, you have learned about the processes of first language acquisition from sounds to constructions. In all the scenarios presented, we simply assumed that the child grew up with only a single language (monolingual). This is, for the most part, unusual. Even though monolingualism is presented as the norm in textbooks, this is not the case for the majority of the population. Many people grow up with one or more additional languages. Quantitatively, multilingualism is more the norm than monolingualism. There are still many misunderstandings connected with the notion of growing up multilingually, which is why we will focus on multilingualism in the final part of Chapter 6. Moreover, it is an important subject for actual language teaching. The following chapter begins by reflecting critically on the various definitions of bilingualism. We will then look at what criteria are used to differentiate the various forms of multilingualism in childhood and critically discuss several explanatory approaches.

Study Goals

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

- – define, distinguish, and categorize various multilingual language acquisition scenarios
- – name theoretical approaches which explain differences in multilingual language acquisition processes
- – recognize and categorize typical phenomena of language use in multilingual children.

6.3.1 Who Is Actually Multilingual?

Would you consider yourself a multilingual? As a language teacher, you have certainly mastered at least one additional language. However, your answer may also depend on how much value you attach to criteria such as the age of acquisition or linguistic competency. Many people would not

describe themselves as multilingual, because they equate multilingualism with the perfect mastery of at least two languages; it may not be as easy to reach a clear definition of multilingualism as expected. Many linguists feel the same.

Opinions on what constitutes a 'multilingual' speaker have always strongly diverged from the very dawn of multilingualism research. The structuralist Bloomfield advocated the extremely idealistic position that multilingualism was the "native-like control of two languages" (Bloomfield 1935: 56). On the other hand, the definition used by the Swiss multilingualism researcher Grosjean focuses on the use of the two languages, rather than competency: "bilinguals are those who use two or more languages (or dialects) in their everyday lives" (Grosjean 2010: 4). A perfect or perfectly balanced knowledge of more than one language is not a condition for being a bilingual speaker, according to Grosjean. Many researchers of multilingualism nowadays assume a similarly moderate position. It is evident from Grosjean's definition that multilingualism researchers are not only interested in speakers who conform to Bloomfield's ideal, but also in a relatively wide spectrum of multilingual backgrounds. The reason for this is in part that researchers no longer view language competency and language acquisition as static, unchangeable categories with clear initial and final states. Like all cognitive abilities, our language competency is subject to a multitude of determining factors: depending on how often we use our language(s), in what type of language environment (are we surrounded by speakers of one or the other language in our daily lives?) and in what social contexts (work or family), the balance between the two languages can shift. When vacationing or staying in a country in which your second language is spoken for an extended amount of time, you have probably experienced that you are able to speak more fluently and can more rapidly access words and constructions. This effect disappears again relatively quickly when the language is no longer used. Children who grow up multilingually have similar experiences. Parents often report how a vacation, say, to the grandparents' home where only one of the children's two languages is spoken, has a huge effect on their language abilities. In a short amount of time, children make great linguistic progress in the language they usually use less. Our language behavior and especially our usage of language changes depending on our situation. It depends on who our interlocutor is, and what the topic of the conversation is. Many studies have also shown that the popular belief that a mother tongue remains strong throughout our life is not true.

A relatively new branch of multilingualism research has been focusing on the phenomenon of language attrition since the 90s. Language attrition typically appears in speakers who have lived in a second language environment. They rarely use their first language which consequently undergoes attrition (cf. Schmid/Köpke/Keijzer/Weilemar 2004). Especially in situations in which the first language has lost its day-to-day relevance, speakers often exhibit great difficulties in accessing the words and constructions of their first language. It seems that aspects of their language competency have partially been forgotten. There are many factors which play a role in how pronounced attrition is, for example: how long the speaker resides in the second language environment, the age of the speaker, but also how strong the speaker's sense of belonging is to the culture of the first or second language, or even their level of education. Nowadays, the dynamic character of language and multilingual acquisition is in the focus of research: de Bot, Lowie & Verspoor (2007) view language acquisition as a complex, dynamic, and constantly changing system. Their work is known as the **dynamic system theory**. With the aid of computer simulations, they illuminate the interplay of different variables (**real-life messy facts**; de Bot/Lowie/Verspoor 2007: 7), which have barely received attention up till now. These interactions can often explain the very different individual outcomes observed in second language acquisition. These include certain (internal) cognitive and social factors which concern the speaker, but also external variables such as input and the interaction between the two (or more) language systems involved.

The growing interest in various multilingual profiles (which do not conform to the 'ideal' bilingual) is also due to the more critical view of the concept of native-likeness and the 'perfect' language competency associated with multilingualism over the past few years. The concept has been increasingly criticized as problematic. Monolingual L1 speakers also differ strongly in their individual linguistic profiles. They differ in the size of their passive and active vocabulary and the extent to which they are able to shift between stylistic registers and regional dialects.

Bilinguals are also not simply the sum of two monolingual speakers. This is evident in the fact that bilinguals rarely possess an exactly equivalent vocabulary of both languages. Instead, there is a 'division of labor' between the two languages, so that they cover day-to-day contexts and functions in which the respective languages are employed. The involvement of the various languages is often tied to specific people or contexts (school,

work, family). Consequently, bilinguals find it easier to talk about certain topics in one rather than the other language. Perfect competency (if it even exists) is, therefore, no longer a necessary or even realistic prerequisite to be deemed bilingual. This does not mean, of course, that we cannot categorize multilingual speakers using various criteria. In this chapter, the scenarios in which acquisition takes place will be differentiated with child language acquisition in mind. We will introduce these to you in the following section.

6.3.2 Multilingual Acquisition Scenarios

How are children raised bi- or multilingually in practise? The research on child multilingualism usually distinguishes between three different acquisition settings. These are distinguished by the **age of onset of acquisition (AoA)**. Since the late 80s, the acquisition type of so-called **simultaneous bilingual language acquisition** or **simultaneous bilingualism** has been the focus of intense research. This acquisition type refers to the scenario of a child being raised hearing two languages simultaneously from the beginning. The acquisition researcher De Houwer sets very strict criteria for simultaneous bilingual acquisition. The child has to be exposed to both languages (nearly) daily starting with the first week after birth. Other researchers also speak of simultaneous acquisition when the second language is added by the age of three or by the age of four at the latest (Meisel 2010). Most researchers stipulate the time period before a child's second birthday, due to the syntactic developmental stages taking place during the first few years of life (see Tracy/Gawlitzek-Mailand 2000). Simultaneous bilingualism is usually the case when parents have different first languages, and each parent communicates with the child in his or her first language. This family language policy is also referred to as the one parent-one language principle (OPOL). Nativist researchers focused heavily on the simultaneous bilingualism acquisition setting, as they assumed that syntax acquisition would not be fundamentally different from that of children growing up monolingually (cf. Meisel 2004). It is indeed the case that there is no fundamental difference between the stages of syntactic acquisition (which you have been introduced to in Chapter 6.2). The developmental stages and their progression are similar between multilingual children growing up with different language combinations and monolingual children of the respective language (Chilla 2011).

Simultaneous bilingual language acquisition is different from **successive bilingual language acquisition** or **successive bilingualism**. This is the case, when two languages are not learned simultaneously from the start: instead, the first language is already at least partially acquired before a child learns the second language (Rothweiler 2007). Successive bilingual language acquisition is much more common than simultaneous bilingualism and is usually found in migration context. The child acquires the language of the country of origin (their heritage language) within the family and is first exposed to the second language when they enter kindergarten or school. The division of labor between the languages is clear in these scenarios: One language is spoken at home with the family, while the other is spoken at school, with friends and teachers, while shopping and so on. Within successive bilingualism, scholars further distinguish between early and late second language learning. Again, the cut-off points are variable and depend on the cut-off points assumed in simultaneous bilingualism. Therefore, the AoA for early language acquisition is between the ages of two and four, or six at the latest. If the second language is introduced between the age of six and ten, it is considered late second language learning. The assumption is that all three types of language acquisition take place in an untutored way, meaning without explicit instruction. Things get complicated, however, when not two but three languages are acquired in early or late childhood. Even though this is a topic which is receiving increasing attention in the field of trilingualism research, we cannot delve deeper into this topic in this chapter.

6.3.3 Explanatory Approaches: Is Age 'Critical'?

Why do researchers distinguish between three acquisition types in childhood at all? Is the AoA truly that significant? The distinction is based on a series of studies which focus mainly on the learning of syntax. The study indicated that children who grow up with more than one language simultaneously pass through the same stages of syntax development as monolingual children of the respective languages. There is no fundamental difference to monolingual children in terms of timing of the acquisition process (cf. Tracy 1996). Experimental studies on the phonological development of multilingual children have shown that babies who are exposed to the sound systems of two languages go through the same typical phases as monolingual children, such as the babbling phase you have been intro-

duced to in Chapter 6.1 (Oller/Eilers/Urbano/Cobo-Lewis 1997). There are strong similarities between the early successive bilingual language acquisition of syntactic patterns and the monolingual acquisition process (Dimroth/Haberzettl 2008). The respective developmental stages can appear staggered in comparison to (bilingual) first language acquisition. This is not always in favor of the simultaneous or monolingual acquisition type. In their study of the acquisition of verb inflection, Dimroth & Haberzettl (2008) found that children with German as an early second language achieve certain developmental milestones even faster than during first language acquisition. The children could apparently rely on previously acquired knowledge and the developmental cognitive stages they had already reached. In general, we can conclude that an early onset of the acquisition process will have strong similarities to the pattern of first language acquisition, at least in the domains of phonology and syntax. The explanation for the differences between simultaneously and successively bilingually raised children depends heavily on the chosen acquisition theory. What you have learned in the previous chapter (6.2) is useful here. The nativist approach ascribes the different learning processes to innate language knowledge, which is only accessible up to a certain, critical age. Therefore, certain aspects of language can only be acquired at a native-like level within certain biologically determined time frames, known as sensitive phases (among others, see Meisel 2013). When an additional language is added after the critical time frame has elapsed, children have to utilize conscious learning mechanisms, and, therefore, can no longer learn a language effortlessly. One would expect, keeping this theoretical assumption in mind, that the various acquisition scenarios exhibit fundamental differences when the age of onset of acquisition is located inside or outside the critical time frame. There is no consensus on how large this time frame is, or even on the concept of a mother tongue. It is also problematic that the proposed age limits cannot be definitely attributed empirically to qualitatively different acquisition data. While it is undisputed that age influences the acquisition process, the differences are slight and not categorical; perhaps you are acquainted with someone who has learned a language long after their sixth birthday and is nonetheless indistinguishable from L1 speakers. Conversely, research on language attrition has shown that language acquisition in early childhood does not guarantee a life-long competency on the level of a L1 speaker. When heritage language speakers, be they adults or children, no longer use their first language, it has a great

impact on their first language competency, including in syntactic domains. There is much to suggest that the continuous use of language beyond childhood plays a more decisive role than the AoA per se.

This is the reason why usage-based theoretical approaches attribute the different acquisition processes to several factors. These include that the age of onset of acquisition is connected to different levels of experience with the two languages and that differences in cognitive development have to be taken in account which influence infant learning processes. However, usage-based approaches view the resulting differences as continuous: The older a child is when they begin learning the second language, the more usage-based knowledge has been accumulated in the first language. It can, therefore, be expected that the second language is influenced by the already strongly automatized form-function units of the first language. From the perspective of the input and its frequency, the result is that the total linguistic input has to be quantitatively distributed among the respective languages in the situation of multilingual acquisition. In practise, this means that a child raised simultaneously bilingually hears each language less than a monolingual child hears their target language. In contrast to nativist approaches, usage-based theories would expect subtle but measurable differences to monolingual children in simultaneous bilingual language acquisition. These differences would result from the different input frequencies of the respective languages (Gathercole/Hoff 2007, Paradis/Nicoladis/Crago/Genesee 2011).

For successive language acquisition, it also has to be taken into account that cognition, processing capacities, and working memory continuously develop in children in addition to their linguistic abilities. We can, therefore, assume that linguistic data in the input is also processed differently at a later developmental stage. A series of astounding computer simulations indicates that cognitive limitations such as limited working memory could even be a requirement for the successful acquisition of complex constructions. With his model of neuronal networks, Elman (1993) showed how simulating the learning process of complex constructions such as relative clauses was only possible when the processing capacity was very limited at first and gradually expanded. The initial processing of only small parts of the input, as is the case with infants' language acquisition, appears to later facilitate the subsequent language processing of more complex patterns. This seemingly paradoxical phenomenon of acquisition is called 'starting small'. From the perspective of usage-based approaches, it is not

surprising that for this reason acquisition processes differ depending on age, but also do not require sharply defined age limits. After all, we learn many abilities in a very different fashion as children than we do as teenagers or adults. Anyone who has tried to learn a musical instrument, to swim or ride a bike as an adult knows how painstaking it is. But we cannot conclude on this basis that there is an innate limit to learning these abilities. This is why construction grammar approaches do not make categorical distinctions between the acquisition types named above. These approaches assume that the mechanism of the language acquisition process is fundamentally the same, independently of whether a language has been learned from birth, early or late childhood or acquired as a teenager or as an adult. It is the cognitive conditions which change (see above) along with the input distribution of the respective languages. This also includes the already acquired linguistic knowledge of our first language, which, like a filter, guides our assumptions. Despite that, the distinctions we made at the beginning of this section represent important categories and remain technical terms for multilingual acquisition research, independently of the theoretical approach adopted.

6.3.4   Multilingual Phenomena: Language Mixing

There are notable characteristic features in the language use of children who are raised multilingually which can be ascribed to the interplay of the acquired languages. These specifically multilingual phenomena are often referred to as **language mixing**. In English textbooks, the term **cross-linguistic influence** is commonly used. Language mixing captured the attention of linguists early on; they also worried parents and educators, who feared that mixed utterances such as that by a German-English bilingual child *Cleanst du dein teeth?* (Are you cleaning your teeth?) (Tracy 2008: 114) were signs of a Babylonian language confusion in the child's head. In the 70s, it was the general opinion of acquisition research that bilingual children possessed an undifferentiated fused language system in the beginning (**fusion hypothesis**; Volterra/Taeschner 1978), that only gradually developed into two separate language systems. From that angle, children growing up with two languages couldn't strictly speaking be considered bilingual as it was thought that the child him- or herself assumed only one language. But in the meantime, numerous studies have confirmed that, against all expectations and worry, multilingually raised children can

differentiate their languages at an early age. And above that, they are very competent in using them context-appropriately.

Even before their second birthday, bilingual children adapt the use of their two languages according to context and conversation partners, even before they begin to produce two-word utterances (Köppe 1997, Lanza 1997). For instance, it has been observed many times how multilingual children correct their own language choices if they do not conform to the linguistic competences and preferences of the communicative partner. This shows that children are conscious of different languages at an early age and that they utilize the languages selectively in consideration of the context. Studies on sound perception in bilingual language acquisition have found such language differentiation capacities to be in place even earlier: Bosch & Sebastián-Gallés (2001) conducted research with infants who were raised with Catalan and Spanish simultaneously. Despite the strong rhythmic similarities between the languages, the infants were able to distinguish the sound inventories of the two languages by an age of four months. On the basis of this and many other findings, the fusion hypothesis was rejected in favor of the differentiation hypothesis (see Meisel 2001). Language acquisition research today assumes that multilingual input does not lead to cognitive confusion, but that children are capable of differentiating their languages by virtue of their language-specific differences as well as the different contexts and functions that the languages appear in; and at a far earlier age than previously presumed.

Language mixing is not a sign that children are incapable of keeping the languages apart. But what exactly are these language mixing phenomena which typically appear in multilingual development? These forms of cross-linguistic influence should be familiar to you from L2 language research with adults: code-switching, borrowing and transfer. Among the most prominent and most researched phenomena is **code-switching**, which can also be referred to as **code-mixing**: here, the speaker switches languages within the discourse or even in the middle of a sentence (see example (1)) or a constituent (as seen in (2) and (3)) (Gardner-Chloros 2009, Poplack 1980).

(1) *Shall we go to the pool oder würdest du lieber ins Kino?* (…or would you rather go to the cinema?)

(2) *Reich mir doch bitte das große black book, the one with the leather cover.* (Please pass me the big black book, …)

(3) *Ich hab versucht, ihn noch aufzucatchen, but was unable to.* (I tried to catch him, …)

Code-switching is particularly noticeable because lexical elements of one language are inserted into an utterance of the other language. Numerous studies on code-switching show that language switches like these do not occur arbitrarily. One language serves as the matrix and provides a frame in which the elements of the other language are inserted. Depending on how syntactically similar the two languages are, it is not always easy to tell which language provides the construction frame. Code-switching is bound to situational and social factors and mostly appears in conversation between bilingual speakers who exhibit a high competency in both languages. Code-switching can be triggered by a change of topic or environment. It belongs to the language repertoire of both multilingually raised children and competent adult bilingual speakers. It is not evidence of linguistic confusion but of high language competency. This was evidenced by detailed analyses of infant code-switches which indicate that children can systematically use both languages as a communicative resource. In the following examples taken from Tracy (2007), Hanna, who is growing up bilingually with English and German, uses both languages to achieve a certain communicative effect:

(4) Mother: *You are reading the newspaper, are you?*
     H. (2;8): *Don't stör mich, nich mich stören, in English or German.* (Don't disturb me, ….)

<div align="right">(Tracy 2008: 114)</div>

The almost three-year-old child in (4) not only exhibits advanced metalinguistic awareness by explicitly naming the two languages, she also uses the negation patterns of both language to emphasize her request to not be disturbed.

Recent studies show that L2 learners successfully use code-switching as a strategy depending on their roles and relationships, topics, and interactions (Masna 2020).

Children also use code-switching ad-hoc to fill gaps in the other language. Assuming a functional division of labor between the two languages (see earlier), it is natural that the vocabularies of both languages do not develop completely symmetrically. Some words in certain contexts may be available in one language, but not yet in the other. This frequently leads to a certain subtype of code-switching, so-called borrowing whereby a word is

temporarily borrowed from the other language. This form of language mixing is almost certainly familiar from adult L2 contexts. It does not have to be a compensation strategy which motivates borrowing. Adults often use borrowing when discussing certain concepts which are culture-specific and do not have a direct equivalent in the other language (such as *Schadenfreude*, i.e., delight in others' misfortune). It is easier and more precise to simply borrow a word from the language of origin than attempting to paraphrase the concept. Multilingual children use borrowing more often to close lexical gaps in one of the two languages. This goes to show once again how proficiently and how early children are capable of skilfully using the resources of one language to close gaps in the repertoire of the other. Language mixing, therefore, does not appear randomly, but is connected to certain communicative and social functions. Some researchers suspect that the direction of the borrowing indicates the dominance of the language in which the borrowed lexeme originated (also see **dominant language hypothesis**; Bernardini/Schlyter 2004). As bilingual children rarely possess perfectly balanced language competences, one of two languages is frequently preferred or dominant. The dominant language is consequently used more often as a gap filler in the utterances of the weaker language. Borrowing is however not necessarily an indication of language dominance: one, mixing also appears when the two languages are relatively balanced, and two, even when one language is dominant, the speaker can still borrow from the weaker language as well (Kupisch 2006).

A far subtler variety of language mixing concerns a series of phenomena referred to as **transfer effects**. These are transfers from one language to the other which can take effect at any linguistic level. Transfer effects can include phonological transfers, that is when individual words or whole utterances are pronounced in keeping with the other language. In the context of bilingual language acquisition, transfer effects have been mainly observed in the domains of language-specific constructions and collocation patterns as seen in (5). Morphological patterns can also be transferred, as seen in (6): in this example, a two-year old French-German bilingual child transfers both the definite article (*die*) and a common plural ending from German (*-en*) and combines them with a French nominal stem (Köppe/Meisel 1995).

(5) *He has three years.* (French: *avoir trois ans* instead of *He is three years old*)

(6) *die poussetten* (French: *poussette* – 'buggy')

Even though attributing linguistic deviations to the other language in the case of multilingually raised children seems logical, one has to tread carefully. Monolingual children also exhibit deviations from the target language in the course of the acquisition process. For example, target-deviant plural endings are also characteristic of monolingual language acquisition in German: especially for nouns that take a zero-plural form (i.e., no ending), such as the word *Hamster* (hamster) are prone to having an *-s* ending added by German-speaking children (Kauschke 2012). In terms of German-English bilingual language acquisition, it would be tempting to blame children's erroneous pluralization of *Hamsters* on the common and extremely frequent English s-plural. You can see that it is not easy methodically to correctly categorize transfer effects in child language acquisition. In order to be able to make clear classifications, it is very important to compare gathered data on such instances with comparable data on monolingual children of the same age. The probability that the second language is an influence increases when certain deviations do not appear, or appear more rarely, in monolingual children.

In addition to the language mixing phenomena listed above, there are also well researched deviations in bilingual children's productions which cannot be ascribed directly to the structures or words of a certain language. These deviations concern quantitative differences in language use, meaning deviations in how often certain constructions are used in comparison to monolingual children. Quantitative differences typically result from similarities or overlap in the acquired language combination in aspects such as certain construction types. Children seem to recognize these cross-linguistically similar patterns and appear to prefer them in their own utterances; they use these structures more often in both languages than monolingual children of each language do. A study on the expression of motion in simultaneous bilingualism showed that English-French bilingual children more commonly used a lexicalization pattern in their French utterances that overlaps structurally with a typical English pattern. Monolingual French children rarely use this pattern in the same context (Engemann/Harr/Hickmann 2012). Bilingual children prefer patterns for expressing motion events (such as *he rolls the ball across the street*) in which the cause and manner of motion are expressed in the verb (*rouler* – to roll) just as in English. English-French bilingual children also typically express the direction of movement outside of the verb, for example with a gerund (*en traversant la rue* – by crossing the street) or via prepositional phrases

(*de l'autre côté de la rue* – on the other side of the street). It is interesting that even though the same utterances appear in monolingual children, they are not used as frequently. It seems that the language-specific properties and the degree of overlap between the acquired languages play a large role in this form of cross-linguistic influence.

What are the implications of these various forms of cross-linguistic influence that characterize bilingual language acquisition? The number of psycholinguistic and neurolinguistic studies focusing on the various factors that determine and facilitate language mixing have strongly increased over the last ten years. It can be said for sure that numerous intralinguistic as well as extralinguistic factors are involved: the interlinguistic factors include language-specific differences and similarities which obviously can be recognized by two-year old children. The extralinguistic factors include factors such as contextual and situational factors such as the presence of a bilingual interlocutor. An important conclusion of contemporary research on cross-linguistic influence is that both language systems are always activated to a certain degree (see Grosjean 2010) and that they interact dynamically. The other language is never completely 'switched off', even when only one of the languages is actively in use (Dijkstra/Grainger/van Heuven 1999).

Language mixing is fascinating because it gives us insights into how children cognitively manage their two languages during acquisition. It provides evidence for the psycholinguistic processes taking place to control the competing languages. The co-activation of both language systems is also the fundamental condition of adult bilingual speakers. In multilingual children however, there are several cognitive factors specific to development which additionally influence the occurrence of language mixing. Children have to first develop the ability for so-called executive control, which is responsible for inhibiting non-relevant information. Executive control includes the ability to deactivate a language when it is not appropriate in a certain context.

6.3.5   Summary

- Multilingual development does not follow a uniform pattern; language competence is subject to dynamic changes throughout life.

- We can distinguish between various scenarios in bilingual language acquisition in children by means of the criterion of the age of onset of acquisition (AoA) (simultaneous versus successive bilingualism).
- Whether age is a critical factor is disputed in acquisition theories. Differences between infant and adult bilingual learners can be ascribed to usage-based factors (input).
- Different forms of cross-linguistic influence typically occur in bilingual language acquisition. These manifest themselves as qualitative deviations as well as quantitative differences in comparison to monolingual acquisition.
- Language mixing is no indication that multilingual children lack the ability to differentiate the languages.

6.3.6   Review Questions

1. Which acquisition scenarios can be distinguished in bilingual language acquisition, and by which criteria?
2. How can the difference between the various acquisition types be explained? Name two theoretical approaches.
3. What is the evidence that bilingual children are capable of differentiating their languages at an early age?
4. What is language mixing and in what forms does it typically occur in bilingual language acquisition?

7 Gestures, Language, and Cognition

While watching people talk, you have probably noticed that they move their hands and arms at certain points when speaking. Speakers can indicate or embody objects with manual movements, as well as depict an object's characteristics or imitate actions. Manual movements can also be used to ask for an answer to a question or to prompt a person to execute an action. These communicative movements of the hands and arms are called gestures. Gestures that accompany speech can do more than just organize human interaction. They are a window into the human mind and are able to give us insights into cognitive processes such as figurative thinking. They would be barred to us if we focused on language alone. Gestures also promote cognitive functions such as memorization and problem-solving.

The goal of this chapter is to introduce the medium 'gesture'. We will first describe the theoretical groundwork and context in which gestures are connected to spoken language, in other words, modern gesture research. The second chapter discusses gestures as an independent medium, even though its relation to language is still paramount. After introducing the gestural modes of representation, we will address how multimodal meaning is created and the function gestures fulfil in that context. The third chapter discusses the role of gestures in foreign language classes. This includes the interactive situation in the classroom and the relevance of gestures for certain cognitive processes such as understanding, memorization, and problem-solving.

7.1 Gestures as Part of Language – Modern Gesture Research

Silva Ladewig

Gestures are communicative movements of the hands and arms which are used in the same way as language: they are meant to transmit the feelings and thoughts of the speaker or to create social order (Müller 1998: 13). While this perspective on gestures initially seems to make sense, it is one connected to a specific approach to language and gestures which was only established in the 1970s. This integrative approach of language and gesture consciously sets itself apart from the field of non-verbal communication which typically reduces the full meaning and function potential of gestural movements to social and interpersonal functions. Unfortunately, this field strongly influences our perspectives on gestures in public, non-scientific discourse. This is the reason why we wish to introduce you to the medium 'gestures' from a modern gesture studies perspective. In doing so, we will place a special emphasis on the integrative approach to language and gestures, which was substantially influenced by David McNeill, Adam Kendon, and Cornelia Müller. Afterwards, we will reflect on the roles of gestures for embodying cognitive processes.

Study Goals

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

- distinguish modern gesture research from the field of non-verbal communication
- understand gestures as an equal part of human communication alongside spoken language, intertwined with speech
- view gestures as part of formulating utterances
- grasp some of the cognitive processes of gestural meaning creation.

7.1.1 Gestures and Language

Viewing gestures as a part of spoken languages goes back to the rhetoric teachings of Quintilian, who saw gestures as companions of spoken

language. He described gestures as an expression of speech acts, attitudes, and emotions, but also discussed their function in terms of individual sections of discourse or the structure of linguistic utterances (Müller 1998: 33–35). Quintilian was convinced that gestures were the natural language of humans and that they exhibited linguistic traits. The idea of gestures as a universal language was discussed and refined in the Renaissance (Bacon, Bulwer), the Enlightenment (Condillac, Diderot) as well as in the Romantic Period (Vico, Herder) (cf. Müller/Ladewig/Bressem 2013). Gestures lost their relevance in the description of human communication when linguistics was established as an independent discipline. Spoken language was supposed to be the sole object of study for linguistics. This resulted in gestures being considered part of parole, i.e. practical language use, at best. Gestures were also merely viewed as an expression of emotion or as having a decorative function in relationship to spoken language. This perspective was reinforced by the reasoning of the research field of nonverbal communication (Ruesch/Kees 1969), which conceptualized gestures as a separate channel alongside speech. The interrelation of gesture and language was generally ignored afterwards. Researchers viewed gestures as an expression of power, social status, emotion, and gender.

The first microanalyses of the correlation between language and bodily movements (Condon/Ogston 1966, 1967, Kendon 1972) marked the emergence of the research field of modern gesture studies. Pike (1967) and Birdwhistell (1970) integrated concepts of structural linguistics into the description of bodily-gestural communication and formulated the broad lines of a theory that unified language and gesture. Adam Kendon was inspired by their work and based on own empirical studies of the structural organization of gesticulation (see Kendon 1980) and its close coordination with speech, Kendon formulated the influential idea: "[s]peech and movement appear together, as manifestations of the same process of utterance" (Kendon 1980: 208). According to him, speech and gesture should be viewed as manifestations of a single process of utterance. He created theoretical and methodical prerequisites for an integrative perspective on speech and gesture in which both modes of expression are equal. With McNeill's groundbreaking essay *So you think gestures are nonverbal?* (1985), the dichotomy between verbal and nonverbal communication was finally overcome completely.

> In the idiom of my title, such gestures are verbal. They are the overt products of the same internal processes that produce the other overt product, speech. (McNeill 1985: 350)

Language and gesture are consequently products of a mental process that controls the production of both modalities. McNeill consolidated his hypothesis with the following empirically proven findings:

- Gestures are produced mainly in conjunction with speech.
- Gestures are synchronized with linguistic units.
- In cases of aphasia, the production of gestures is impaired similarly to language.
- Gestures develop parallel to infant language acquisition and
- gestures perform semantic and pragmatic functions which are parallel to speech.

McNeill's revolutionary essay incited an impassioned controversial debate on the driving force behind gestures: either gestures and language were viewed as two semiotically different but equal parts of the process of utterance (McNeill 1985, 1992), or gestures were thought to have a supportive function for lexical access and cognitive planning processes (Butterworth/Hadar 1989, Feyereisen 1987). This debate led to an increase in studies on the phenomena of multimodal communication.

David McNeill, like Adam Kendon, has dedicated his research to the co-expressivity of speech and gestures ever since, and described multimodal utterances forms of expression in which speech and gestures interact. For this reason, both researchers are viewed as the founding fathers of modern gesture studies. We must note, however, that David McNeill and Adam Kendon postulated very different theories of speech-gesture integration which sparked different schools within the research field. While David McNeill worked on a psychological take on language and gesture, Adam Kendon developed an interactional approach to multimodal communication in which gesture and speech are described as **forms of action** (Kendon 2004: 161, 174).

Cornelia Müller's linguistic approach to gesture combines Kendon's interest in formal and structural features of gesture with an interest in the description of the cognitive basics of verbal-gestural meaning constitution.

She examines both foci in everyday conversation, though the main focus is on the medium 'gesture' itself. Based on Kendon's idea of features of manifest deliberate expressiveness (Kendon 2004: 13–14), the form of the gesture is the baseline for Müller's examinations and descriptions. The various configurations are viewed as potentially meaningful kinesic units: for example, the orientation of the palms, movements, and positions in the gestural space of one hand.

Müller calls the articulatory effort a communicative effort (Müller 2014a) in reference to Kendon. Gestural movement is regarded as motivated (cf. Calbris 1990, Mittelberg 2006) and as derived from the everyday practical movements of hands and arms (cf. Streeck 1994, 2009). It will become clear in our subsequent discussions that Müller is an advocate of the thesis that gestures have linguistic potential (Müller 2013; also see Armstrong/Wilcox 2007). Based on her functional classification of gestures she reasons that gestures fulfil Bühler's communicative functions of language (1934): these being the expressive function (Ausdruck), the appealing function (Appell) and the representational function (Darstellung). Thanks to Müller's efforts among others, gestures are now also central to linguistic descriptions.

We have now presented three theoretical access points to the medium of gesture and its relation to language. We must note that this is only a brief introduction to the subject and cannot possibly be considered comprehensive. The field of modern gesture research is an interdisciplinary research field in which the different disciplines formulate different theoretical and methodical approaches to language and gestures. The approaches we have briefly outlined will be the focus of the following section.

7.1.2 Gestures and the Formulation of Utterances

As mentioned earlier, the research of the interplay of speech and gestures on the level of formulating utterances is the focus of modern gesture research. Other objects of interest in gesture research are, for instance, the correlation of body movements and the patterns of speech flow, the distribution of semantic information via the different modes of expression, and the syntactic integration of gestures into utterances. These are also aspects we wish to describe in further detail over the next few pages.

Based on observations which indicate that body movement is synchronized with the units of speech flow (Condon/Ogston 1967), gesture researchers have always focused on the timing of gestural and linguistic units. The hierarchy of gestural units created by Kendon (1972) serves as a starting point for research. Kendon's hierarchy postulates an internal structure of gestural movement (**sequential structures**; cf. Müller/Ladewig/Bressem 2013). The first thoughts were already formulated towards the beginning of the 20th century, which described gestures as having a three-part sequential structure. This structure is constituted of a preparatory phase, a stroke phase, and a recovery phase (Mosher 1916, Ott 1902). These units, called gesture phases, are also described by Kendon (1972), who also added additional phases (see Figure 7.1). He describes several phases of holding which are executed either before or after the meaningful part of a gesture, the **stroke** (pre-, post stroke hold). Kendon names the units that are thus created **nucleus**. Preparational phase and stroke phase are subsumed under the term **gesture phrase**. A gesture phrase paired with a retraction phase results in a **gesture unit**, according to Kendon. It is important to mention that not every gesture necessarily constitutes all of these phases. Individual phases can be dropped or melded into each other (for more information, see Bressem/Ladewig 2011). However, a gesture always consists of a stroke, the meaning-bearing phase. If this is not the case, no gesture exists.
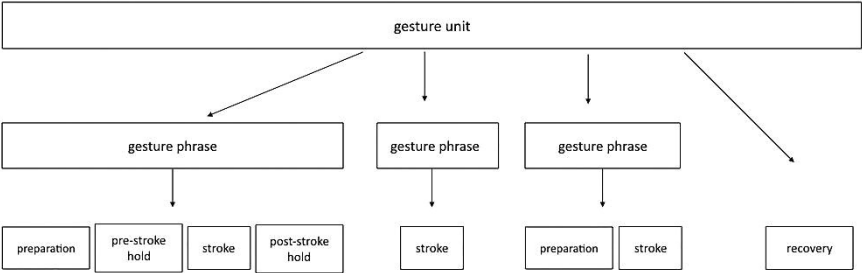
Figure 7.1: Linear structure of gestures based on Kendon (2004)

By using this vocabulary for determining movement phases, it is possible to examine various forms of speech-gesture integration. Stroke as well as various holding phases form reference points in relationship to speech. In this way, the studies were able to show, among other things, that

- the apexes of strokes correlate with pitch accents (Loehr 2004, McClave 1991, Tuite 1993)

- body movements align with intonation of speech (Birdwhistell 1970, Bolinger 1983)

- speakers, in some cases, delay performing the stroke until it can be synchronized with the lexical affiliate (for instance, Kendon 2004, Seyfeddinipur 2006).

You can see that gestures and speech are tightly coordinated and form a multimodal unit (**gesture speech ensemble**; Kendon 2004: 127). This suggests that gestures and language go through the same planning process of utterances, which enables them to be produced in synchronicity. "The way in which gesture and speech are employed together […] can only be understood if it is agreed that they are planned for together" (Kendon 2004: 116).

The close interplay of language and gesture in the production of utterances is also apparent in the cases in which gestures are used obligatorily, such as local deictics. If you consider deictic expressions such as *like this, here, there* you realize that they are insufficient without accompanying gestures. What these deictic expressions refer to only becomes apparent in combination with gestures (Fricke 2007, Stukenbrock 2015). This means that there is a close connection between gesture and speech, as local deictics are contingent on gestures. This link also becomes visible when we examine the form of gesture and the corresponding reference object. Studies have shown that gestures exhibit different aspects of form when the referential object of the deictic expression changes. Should a speaker verbally refer to a point in space such as in the utterance *Mein Auto steht dort* (My car is parked over there), the gesture is performed with an extended index finger ('**Raumpunktdeixis'**; Fricke 2007; also see Kendon 2004). If a speaker verbally refers to a certain direction, as in the example *und dann gehst Du hier geradeaus* (and then you go straight ahead here), a flat hand is usually exhibited ('**Richtungsdeixis**'; Fricke 2007).

The interaction between gestures and speech can also be discerned on the level of syntax and semantics. One of the earlier observations found that gestures often correlate with words of closed word classes such as nouns, verbs, and adjectives (Krauss/Hadar 1999) or integrate gestures in syntactic gaps (Slama-Cazacu 1976). More recent systematic analyses of speech-gesture integration on a syntactic-semantic level show that gestures mainly

replace nouns and verbs (Ladewig 2014a, 2020), though it is also possible for adverbs and adjectives (Bressem 2014, 2021, Fricke 2012). It means that you can form the semantic core of an utterance or add qualitative information to a linguistic unit with gestures. Based on these empirical findings, researchers advocated that functional and cognitive grammars should be expanded to include the medium of gestural expression (for instance, Bressem 2021, Fricke 2012, Ladewig 2014a, 2020). We will discuss the intertwinement of gestures and speech on the levels of syntax and semantics in more detail in Chapter 7.2.

7.1.3   Gestures and Cognition

Researching gesture and language from a cognitive linguistic perspective is always connected with an interest in fathoming cognitive processes, mental knowledge structures and the connection of body and mind. David McNeill's thesis sparked interest in exploring the cognitive foundation of gestures; a thesis stating that gestures are a "window into the thinking" (McNeill/Duncan 2000: 143). McNeill's publication *Hand and mind. What gestures reveal about thought* (McNeill 1992) had great impact on the psychological perspective on gestures. Moreover, McNeill's observations of metaphoric gestures focused for the first time on embodied metaphors as an object of research. It has since inspired much gestural research. The reason for that does not lie alone in the expansion of gesture's spectrum of meaning, but his observations also imply that figurative processes cannot only be expressed linguistically, but also gesturally to portray the world and make it tangible. It is not particularly surprising that metaphors can also be used in other modes of expression, considering that they are known as general processes of human cognition. Like metonymy metaphor uses bodily experiences as a basis for creating knowledge structures. For a long time, gestures were excluded from the analysis of metaphoric and metonymic processes. In the following section, we will focus on metonymies and metaphors and introduce them as cognitive processes which underlie the formation of verbal, gestural and verbal-gestural units.

7.1.3.1   Metonymic Processes in Gestures

A process of meaning transfer within conceptual knowledge structures takes place with the occurrence of metaphors as well as metonymies

(Evans 2007; compare the term 'domain' introduced in Chapter 3.2 of this Volume). In contrast to conceptual metaphors, this transfer takes place inside a single domain for metonymies (see Chapter 3 of this volume, as well as Chapter 2 in *Language Learning and Cognition*). In prototypical metonymical relations, the source domain is not blurred but conceptually present and salient. The target domain constitutes of an elaboration of the source domain, even though the source domain consists of a component of the target domain (cf. Panther 2005: 358). The expression 'x stands for y' is typical for a metonymical relation, meaning that one entity stands for the other. An often-quoted example of literature in this regard is the sentence *The hamburger is waiting for its check* in which the meal stands for the person who ate the meal.

Metonymical processes have repeatedly been the focus of gesture research (Calbris 2011, Ishino 2001, Müller 1998, 2004). It was Mittelberg (2006) who finally supplied a comprehensive and systematic description of metonymical processes in gestures and who described metonymies as a process of gestural sign creation. Mittelberg argued that from the perspective of the recipient, he or she follows the gesture on to a metonymical path that opens a connection between the gesture and the inferred object of reference. According to her, the gestural form is the starting point of the process of interpretation, in which gestures are interpreted as imitations of an action or as a representation of an object.

Figure 7.2: Imitation of an action with an object (Ladewig 2020: 96)

In Figure 7.2, we see a speaker whose left hand is balled into a fist that is pointed downwards. The gesture is positioned in the centre of the gestural space. The hand is moved towards the speaker in a slightly curved form (on the description of gestural forms, see Bressem 2013). The form of the gesture suggests the imitation of an action in which an object is enclosed by the hand and moved in the direction of the speaker. There are two metonymical processes which are the foundation of this particular interpretation, which Mittelberg (2010) describes:

(1) **internal metonymy**: the movement pattern of the gesture reflects the movement sequence of the original action. The gestural depiction is thereby reduced to salient features of the action. This means that not the whole motion sequence is depicted, as it would demand a certain physical effort or hand tension. Only the individual parts of the action schemas bearing meaning are singled out and embodied in the gestures.

(2) **external metonymy**: the shape and size of the object depicted gesturally needs to be reconstructed via the shape of the hand. If the object fits into the palm of the hand and can be enclosed by the hand as in the earlier example (see Figure 7.2), we can conclude that the object is of a small size. If two hands are necessary to depict the action, we can conclude that the embodied object is larger. In all cases the virtual object would be adjacent to your hand(s) and would not be part of it (them). However, the objects are not visible when being depicted gesturally. We have to infer them. As the real objects are situated outside of the hand in the action as well as the virtual objects in the mimed action this process of inference is called external metonymy.

Basic information such as the size or shape of objects can be reconstructed via the gestures. Which action and which object the gesture exactly depicts, however, can only be deduced through its relation to speech (see Chapter 7.2). Metaphoric processes can play a role in this regard.

7.1.3.2 Metaphoric Processes in Gestures

Imagine that the speaker uses the gesture represented in Figure 7.2 in accompaniment of the utterance *It has opened many doors to me* while referring to milestones of his or her career path. The whole multimodal

utterance, therefore, refers to an abstract concept – the 'career path' – and does not refer to the concrete action of opening doors, such as to an office. We can reconstruct from this interplay of speech and gesture that this iconic gesture is used metaphorically; it refers to an abstract concept. As you have seen in Chapter 3.2, it is characteristic for metaphors that a transfer process (mapping) takes place in between two domains, the source, and the target domain. A frequently quoted example of cognitive linguistics is the metaphor LOVE IS A JOURNEY, in which love is conceptualized as a journey (Lakoff/Johnson 1980). The metaphoric utterance *We have reached a dead end* instantiates this metaphor, it is argued. The travellers are equated with the lovers in this metaphor, the love relationship with a journey and the end of the relationship is the end of the journey. Linguistic utterances such as these are an expression of cognitive, metaphoric processes (for a critical examination see Müller 2008a, b, Müller/Ladewig 2013, Müller/Kappelhoff 2018).

> Like an iconic gesture, a metaphoric gesture is formed but this form does not depict aspects of the situation being described. Rather, the form depicts the vehicle of a metaphor. The gesture is iconically related to this vehicle, not to the meaning, or tenor of the metaphor (Richards, 1936). Like a verbal metaphor, a gestural metaphor conveys meaning indirectly. (McNeill/Levy 1982: 274)

Studies on the relationship between speech and gestures have argued that gestures can form multimodal metaphors in accompaniment of speech. In doing so, gestures often embody the source domain of a verbalized metaphor (Cienki 1998). The flexible relationship between gesture and speech is especially of interest. Metaphoricity can be **monomodal**, meaning that it can be expressed in language or gesture or **multimodal** when expressed in both modalities (Cienki 1998, Cienki/Müller 2008, Müller/Cienki 2009). The example depicted in Figure 7.2 is such a multimodal metaphor. The action of opening the door, gesturally imitated by the grasping and pulling of the handle, is the source domain of the metaphor. With its linguistic context *It has opened many doors to me* we can reconstruct that the gesture does not refer to the opening of actual doors, but to the speaker's profes-

sional opportunities. The opening of the abstract doors indicates the opening of new professional areas.

But there are also multimodal metaphors that convey different metaphoric concepts in speech and in gestures.

Figure 7.3: *In zehn oder zwanzig Jahren, da sieht die Sache ganz anders aus* (Things will look different in ten or twenty years); gestural embodiment of time metaphors (Müller 2010a: 170)

The example in Figure 7.3 depicts a speaker referring verbally to periods of time that are located in the future. From a linguistic perspective, this is a so-called dead metaphor (see Black 1962) which is so entrenched that we no longer recognize the utterance as a metaphor in itself. The speaker conceives the periods of time as a container, which is apparent by her use of the preposition *in*. It seems as if she were conceptualizing the periods of time in a way that one would be able to physically enter them. If we look at her gestures, we see that the idea of a container is embodied here. Both hands represent the physical limits of an object, a container. If we follow Müller's (2008b) argumentation, then the dead metaphor is gesturally activated, revived, and no longer dead. The metaphor TIME PERIODS ARE CONTAINERS can, therefore, be reconstructed in both modalities. The second metaphor is a different case: it is expressed solely through gestures and is, therefore, monomodal. The hands of the speakers move on an axis from left to right. The left pole of the axis represents the past, the right pole represents the future. Even though the axis is not verbalized, it can be

frequently observed when speakers conceptualize periods of time sequentially (Calbris 1990, Casasanto/Jasmin 2012, Cienki 1998).

With respect to the two cognitive processes metonymy and metaphor, we can conclude that metonymical processes almost always operate in the constitution of gestural signs. The only exceptions are gestures which are actions in themselves, such as waving or blessing. Metaphors are not always activated when construing gestural meaning. Furthermore, metonymic processes of inference are initially activated in the processes of gesture interpretation and sign constitution. Metaphoric processes are downstream to these. Returning to the example of Figure 7.3, we can say that the recipient of the gesture first reconstructs the object of a container via the gestural form. The metaphoric conceptualization of the container as a time period is the second step. This two-step process of interpretation is known as **metonymy first, metaphor second** (Mittelberg/Waugh 2009).

7.1.4   Summary

-   Gestures are predominantly produced with speech. Both modes of expression are deeply interconnected on the interactive and cognitive level.

-   Gestures can be divided into phases and can constitute larger gestural units. This segmentation is important for describing how gestures are integrated into spoken language.

-   Construing multimodal meaning is very complex. Gestures can represent concrete as well as abstract concepts. Metonymical processes are always involved in gestural sign formation. Metaphorical processes take place when a gesture refers to an abstract concept. In our example, gestures embody 'dead metaphors' and thereby (re-)activate them.

-   Due to the aforementioned findings, gestures are viewed as an integral part of speech. This assumption constitutes the research paradigm of modern gesture studies, which distances itself from the field of nonverbal communication.

7.1.5   Review Questions

1.   Name three theoretical approaches to the medium of gesture and its relation to language.

2.   Name the potentially meaningful kinesic units of body movements.

3.   What is the focus of modern gesture research? Name the objects of research that result from this focus.

4.   What is a 'dead metaphor'? Describe the influence that gestures can have on these 'dead metaphors'.

5.   What does the term 'metonymy first, metaphor second' mean? Explain using an example from the text, in which a container is metaphorically conceptualized with gestures.

7.2 Gestures and Their Meaning

Silva Ladewig

In the previous chapter, you learned that the medium 'gesture' should be considered as equal to language. Gesture and language are closely intertwined when conveying information. You have also learned that gestures have an internal structure that is reminiscent of protolingual structures. The gestural structure can be divided into individual phases, which again can form larger units. You have also gained a first impression of how complex the process of gestural sign creation and interpretation is. The meaning of a gesture is construed via its form and by utilizing metonymical processes and via its relation to speech. The iconicity of the gestural form enters an interactive process together with the symbolism in speech. It is precisely this interactive process which we wish to illuminate further in this chapter. We will first describe gestures as an independent medium and then discuss the functions which gestures perform in relation to speech. From this discussion we will derive a typology of gestures.

Study Goals

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

- analyze aspects of the mediality of gestures and thence the iconic potential of communicative hand movements
- understand the interaction of language and gestures on the descriptive levels of semantics, syntax, and pragmatics
- understand a functional typology of gestures.

7.2.1 Gestures as Semiotic Signs

If we wish to explain the meaning of gestures, we should first consider the medium of 'gesture' which exhibits its very own aspects of mediality. For this reason, we will briefly outline the notion of gestures as semiotic signs.

7.2.1.1 Form Is Meaning

"If we explain the meaning of a gesture we explain the form" (McNeill 1992: 23). The form of a gesture is the starting point of the gestural process of meaning-making; the meaning of a gesture manifests in its form. A gesture, for example, which uses both hands to draw a round form into the air will be referring to something round and/or contained such as a ball, a (round) mirror, a unit, a group, or the feature of 'roundness'. It would be very unlikely that such a gesture would be meant to depict objects with angular, straight characteristics or which exhibit openness.

Hence, the meaning of a gesture is reflected in its form and is, therefore, regarded as motivated. There are no standards observable for the medium 'gesture' in terms of form. Gestural form and meaning units are usually spontaneously created in the moment of speaking. They are imbedded in the propositional content of an utterance. Conventionalized gestures are an exception as will be seen later in this section (see Figure 7.5). Thus, gestures differ strongly from the processes of meaning creation in language. There are two systems that can be found here, which are connected by convention. The connection between the form (sounds) and the meaning of a lexeme is random and arbitrary (see Chapters 4.1 and 4.2). It is described as untransparent and unmotivated (de Saussure 2001). The sequence of the sounds [/bɔːl/] for instance has little in common with the object it refers to. A circular gesture does. This gesture can mirror the characteristics of the object referred to with the sound sequence [/bɔːl/].

There are different approaches in gesture research which focus on the meaning formation of gestures. One of the most influential is David McNeill's approach (1992). McNeill views gesture as a holistic gestalt which conveys meaning global-synthetically. It means that gestures convey meaning of the whole gestalt via individual parts, i.e. hand shape, movement, or position, and not analytically with the sum of its individual parts. McNeill calls this feature **global**. Another term McNeill introduces is **synthetic**. Here he refers to his observation that more than one semantic aspect can be united in a single gesture. McNeill cites the example of the wiggling fingers gesture which portrays a person walking along a wire.

> This gesture-symbol is global in that the whole is not composed out of separately meaningful parts. Rather, the parts gain meaning because of the meaning of the whole. The wiggling fingers

mean running only because we know that the gesture, as a whole, depicts someone running. It's not that a gesture depicting someone running was composed out of separately meaningful parts: wiggling + motion, for instance. The gesture also is synthetic. It combines different meaning elements. The segments of the utterance, "he + running + along the wire," were combined in the gesture into a single depiction of Sylvester-running-along-the-wire. (McNeill 1992: 20–21)

McNeill is of the opinion that speech and gesture are subject to one and the same mental process: "gestures share with speech a computational stage; they are, accordingly, parts of the same psychological structure" (McNeill 1985: 350). This mental formation process has its starting point in a mental unit referred to as the growth point. Gestalt-like elements of both sides of the production process are joined in this mental unit. Furthermore, McNeill assumes that the different forms of thinking interact with each other during the formation process of multimodal utterances. This is expressed in the different modalities: gestures are viewed as the visual part of thought, which are generated gestalt-like in iconic representational processes. They unite several aspects of formation. Speech reflects linguistic, analytical thinking. Individual, meaning-bearing elements contribute to the overall meaning; the individual elements can be joined linearly on the time axis. Language can also form units of different complexities that exhibit hierarchical characteristics. These characteristics cannot be observed in gestures, according to McNeill (but see Kendon's idea of gesture units introduced in Chapter 7.1).

There are other approaches that view gestures as actions or as interactional features motivated by rhetorical goals (**visible actions**; Kendon 2004), for instance, and those which consider gestures to be techniques necessary for handling the extralinguistic world (see Streeck 2009). Other approaches emphasize the linguistic potential of gestures. We focus on the latter and hence on a linguistic-semiotic approach (Müller 1998, 2013, Müller/Bressem/Ladewig 2013, Müller/Ladewig/Bressem 2013) and introduce techniques of gesture creation and gestural functions with and without relation to speech.

7.2.1.2   Gestural Modes of Representation

According to Müller (1998, 2013), gestures and language accomplish a similar spectrum of function and expression. Still, they differ in their semiotic features. A linguistic-semiotic approach focuses on the medial singularities of gestures, i.e. their specific semiotic characteristics. This is an important step, for as you have seen, the form conveyed by the medial characteristics of gestures plays a significant role in the creation of gestural meaning. In order to help you grasp these medial characteristics of gestures, we will introduce techniques for gesture creation: the so-called **gestural modes of representation** (Müller 1998, 2014b). We will also describe simultaneous and sequential structures in gestures (Müller/Bressem/ Ladewig 2013); the first referring to gestures' internal structures discernably via individual form parameters (for instance, Ladewig/Bressem 2013); the latter describing to the sequential combinability of gesture phases, which you have been introduced to in the previous chapter. For limitations of space, we will only go into detail on gestural modes of representation in the following section.

With her concept of gestural modes of representation, Müller (1998, 2010a, 2014b) carves out one aspect of the representational spectrum of gestures and tries to account how movements of the hands and arms become communicative signs. She distinguishes between four techniques of gesture creation: acting, molding, drawing, and representing (see Figure 7.4).
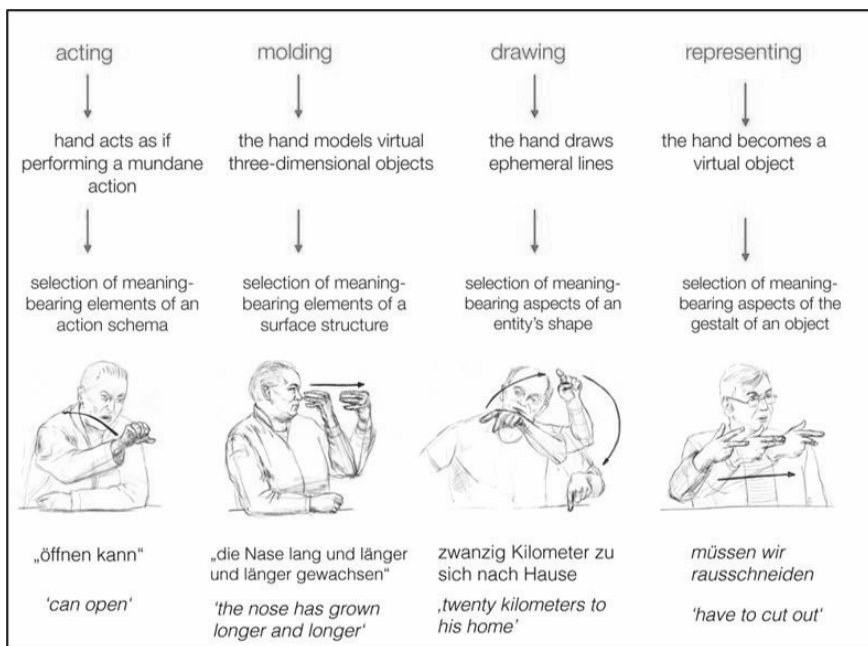
Figure 7.4: Gestural modes of representation (Müller 1998, 2014b)

When the hand acts, it acts as if executing an everyday action. The mimed action involves an object in most cases, which the recipient has to infer. If we look closer at the first example in Figure 7.4, we see that the speaker forms a fist with his hand and moves it in the direction of his upper body. The gesture is performed simultaneously with the last part of the utterance *Dass man ein Fenster aufmachen, eben auch öffnen kann* (a window can be opened). The speaker uses the gesture described above simultaneously with the verbal phrase *öffnen kann* (can be opened) and imitates the holding and pulling of an object. It is apparent through the verbal language that the object being pulled is the handle of a window in this case. These aspects are both inferred through metonymical process by the recipient, which we will explain in more detail later (also see Chapter 7.1). In the second example (counted from the left in Figure 7.4) the hand pretends to mold a three-dimensional object. The speaker is talking about the figure Pinocchio and is saying *Wenn er gelogen hat, ist dem kleinen Holzjungen die Nase lang und länger und länger gewachsen* (When he lied, the nose of the wooden boy grew longer and longer). When uttering the phrase *die Nase*

288

lang und länger und länger gewachsen (literally: the nose long and longer grown), the hand moves away from the body, starting from the nose. It shows a configuration in which all five fingers are brought together and are nearly touching. This configuration and the accompanying movement indicate for the recipients that the speaker is molding a longish object that is localized at nose-height. Here again, the recipients need to imagine the object and reconstruct it via metonymical processes. Through the accompanying speech, it becomes apparent that the depicted object is a very long, growing nose.

The third example (from the left in Figure 7.4) shows a speaker performing a drawing gesture, while speaking about a person driving 20 km to his or her home. When saying the phrase *zwanzig Kilometer zu sich nach Hause* (twenty kilometers to his home), the speaker draws the course of the road, albeit not with a pen on paper but with his index finger into the air. The index finger of his left hand performs a curved motion, creating a two-dimensional, curved, ephemeral, and virtual line, which represents the path the person travels on. This very specific meaning is once again apparent via the spoken language.

The cases we have just described are based on the imitation of actions. We can handle concrete and real objects with our hands, we can mold existing sculptures and we can use our index finger to draw the shape of an object into the sand. This is why Müller includes molding and drawing into her newest classification of acting (Müller 2014b).

A different process is active in the last example (to the far right in Figure 7.4). In this case, the hand is transformed into an object. The speaker extends the thumb, index finger, and middle finger of his right hand and alternatingly opens and closes the index and middle finger. At the same time, the speaker moves his right hand, whose palm faces towards his body, in the direction of his left arm. The gesture is used simultaneously with the verbal utterance *müssen wir rausschneiden* (we need to cut it out). We can, therefore, conclude that the object embodied is a pair of scissors and not a knife, for instance. The hand embodies the individual elements of a pair of scissors: The index and middle finger imitate the object's scissor blades. The gestural movements represent the movements of the scissors itself. It cannot be equated with the movement of a hand holding a pair of scissors while performing the act of cutting. This gesture would show a different form.

The various modes of representation reflect the perspective of the speaker on an object in the moment of speaking and/or gesturing. It appears alongside different forms of conceptualizing and abstracting for which metonymy plays a significant role.

The term 'metonymy' denotes the process of meaning creation in which one stands for the other ('x stands for y'). As we have seen, this process can be expressed linguistically as well as gesturally (cf. Chapter 7.1). Depending on the mode of representation, different metonymical processes are activated which respectively focus on different aspects of gestural representation. All four modes of representation have in common that salient features of objects, actions, and processes are singled out and embodied gesturally. When imitating an action (acting mode), for instance, the speaker or rather the gesticulating person selects salient and meaning-bearing elements of the action schemas. His or her hand or arm thereby always function as part of the imitated action. This is illustrated by the first example in Figure 7.4: the hand and arm of the speaker are part of the actual action being imitated, that is opening a window by its handle. As we have shown in previous chapters the role of the hands and arms in the process of meaning creation is deduced via 'internal metonymy' in actions imitated gesturally. The objects involved in the action are inferred via 'external metonymy' as these could be found adjacent to the hand (see Chapter 7.1). It is a similar case for the modes of representation 'molding' and 'drawing'. The speaker selects meaning-bearing elements of a surface gestalt (molding) or a form or line (drawing) and embodies them using hands and arms. The hand is part of the imitation of the action in both cases (internal metonymy) and the molded object or the drawn shape are found externally, albeit adjacent to the hand (external metonymy).

External metonymy is not active in the cases of gestures in the representing mode, in which the hand virtually becomes the object. Individual meaning-bearing elements are singled out and gesturally embodied here also. Yet, the objects that are embodied are not reconstructed from outside of the hand, but the hands themselves are transformed into objects. The final example in Figure 7.4, shows the index and middle fingers as embodied features of the scissors, i.e. the moving scissor blades.

As noted before, the mode of representation shows how a speaker conceptualizes the object being discussed. This observation is in accordance with McNeill's (1992) assumption that gestures are windows onto thinking. It goes without saying that conceptual meanings cannot be reconstructed

solely via gestures. Spoken utterances are also required. What can be frequently observed is that semantic aspects are specified with gestures. If we look at two examples from Figure 7.4 once more, we see that the first example shows a woman who refers multimodally to the action of opening something. How this process has been conceptualized, meaning the manner in which it was opened, is conveyed solely with the gesture. A window could be opened by, for instance, opening it in an outward motion or by pushing it upwards. In the last example of Figure 7.4, the speaker refers to the action of cutting something (out). We could argue at this point that the action could have been embodied by the hand simulating holding a pair of scissors and imitating the movement of alternatingly opening and closing the scissor handles; in other words, the movements a hand would make when holding an actual pair of scissors. The speaker in the example however decides to use a different mode of representation and thus focuses on other aspects of the action depicted, i.e. the object with which the action is performed. As such, the object instead of the instrumental action is in the foreground for the speaker as well as for the recipient.

7.2.2 Gestures and Their Relationship with Language

Gestures only attain their full meaning in interaction with speech. Gestures and speech specify each other in equal measure, as seen in Figure 7.4: the verb *öffnen* (to open) can refer to various actions including the opening of an object and the opening of a space. But in conjunction with the gesture, we and the recipients can reconstruct that the speaker is referring to the use of a handle and the pulling of this handle. This handle could again belong to a window or a door or something else. These specifics of the gestural meaning can be deduced from the linguistic context. In the case we just discussed, we can reconstruct via the linguistic information that the speaker is referring to a window.

With these observations, we move to the level of gesture-speech interaction. This means that the meaning potential of the medium 'gesture' only, i.e. without its interaction with speech, is no longer solely in the foreground of our descriptions. Rather, the close interaction of the two modalities is now in our focus.

7.2.2.1 The Semantic, Syntactic, and Pragmatic Relations of Speech and Gesture

In order to be able to describe the reciprocal relationship in the constitution of meaning, we will first elaborate on the concept of co-expressivity, which McNeill (1992, 2005) described thus:

> Gesture and speech express the same underlying idea unit but express it in their own ways – their own aspects of it, and when they express overlapping aspects do so in distinctive ways. (McNeill 2005: 22)

Both units, the gestural as well as the linguistic, should refer to the same object in discourse (also see Engle 2000: 26), so that they can be viewed as co-expressive. They do not necessarily have to be expressed simultaneously as they can stand within a certain temporal distance of each other. According to this definition, we can distinguish between the following co-occurrences:

(1) pre- and post-positioning and with that between the sequential composition of linguistic and gestural units

(2) parallel use, meaning the simultaneous appearance and overlap of speech and gesture, and

(3) the sole use of gestures.

In the case of (3) there is no linguistic counterpart at the moment of production. Based on this temporal relation between speech and gesture we can specify the relation between both modalities by introducing the descriptive levels of semantics, syntax, and pragmatics. A more detailed elaboration on the reciprocal relationship between speech and gestures can be found in Bressem, Ladewig & Müller (2013).

complementary/ supplementary	Speech and gesture share semantic features but the gesture contributes semantic features to speech
contrary	Speech and gesture do not match in the semantic features and do not form an overlapping set of features
replacing	gesture substitutes speech

Table 7.1: Semantic relations between speech and gestures (Bressem/Ladewig/ Müller 2013: 1111–1112)

The semantic relationship between speech and gesture exhibits the following relations: complementary, contrary, and substitutive. If speech and gesture stand in a complementary relation to each other, both modes of expression share semantic characteristics, but the gesture adds information to the speech and thereby modifies the linguistic content. If they stand in a contrary relation to each other, the two different modes of expression each transmit different information. The gesture supplements information. When gestures replace speech, they substitute linguistic information.

Modification is the semantic function which is observed most frequently. The examples we have listed in this and the preceding chapters are all located in this functional area. Research literature often refers to a redundant relationship of speech and gesture. Scholars of gesture assume that in these cases the modes of expression convey more or less identical information. However, as a redundant relation is quite rare or not observable at all, we have omitted it. We chose to follow McNeill's concept of co-expressivity, which emphasizes that:

> Two core features of gestures are that they carry meaning, and that they and the synchronous speech are co-expressive. Co-expressive, but not redundant […]. (McNeill 2007: 23)

When looking at the two modalities 'language' and 'gestures' in more detail, it is highly improbable that both modes of expression are redundant. Due to their mediality, gestures express concepts visio-spatially and in this way can add and specify aspects of meaning.

Gestures are not only integrated into speech on a semantic level, but also on a syntactic level. Gestures can assume the positions of, for instance, nouns or verbs and replace speech such as in the sentence *Er hatte vorne drauf diesen seltsamen* [*Geste*] (On front he had this weird [gesture]) (Ladewig 2014b, 2020; see Table 7.2). They can also be used simultaneously to nouns or verbs (Bressem 2014, 2021; see Table 7.2). Additionally, gestures can be integrated cataphorically into speech by using verbal deictics such as *such, like here, this* (Fricke 2012, Streeck 2002). This means that gestures can take over the functions of nouns and verbs or specify verbally-expressed nouns or verbs by assuming the function of adverbs or attributes.

	replacing speech	temporal overlap	temporal succession
positional integration	fills a syntactic gap	executed simultaneously with speech	
cataphoric integration		verbal deictics (like, here, this, such)	

Table 7.2: Syntax relations of speech and gesture (Bressem/Ladewig/Müller 2013: 1109–1110)

Gesture and speech can also be integrated on a pragmatic level and thereby accomplish a pragmatic function. If this is the case, the gestures or speech can refer to the speaker or the addressee and operate on the level of interaction or on the level of discourse (see Table 7.3). If they regulate or structure the behavior of the speaker, for instance to express that he or she wants to maintain the right to speak, or when a gesture expresses a negative attitude with respect to what has been said (as seen in the so-called 'brushing aside gesture'; Bressem/Müller 2014a, Teßendorf 2014), it definitely operates on the level of interaction and performs a modal function. Gestures which relate to addressees regulate the behavior of others and fulfil a

performative function (Müller 1998). This is the case, when a speaker wards off the arguments of a dialogue partner with gestures or interrupts him or her with gestures. When gestures operate on the level of discourse, they perform a discursive function (ibid.). This can be frequently observed in repetitive, accentuated gestures which are often mistakenly called contentless beat gestures (Efron [1941] 1972, Ekman/Friesen 1969, McNeill 1992; for more discussion see Bressem 2021) which highlight elements of a speech and thereby make them salient.

	interaction		discourse	
towards the speaker	regulating and structuring own behavior	modal function	operating on own utterance	discursive function
towards adressee	regulating and structuring behavior of others	performative function		

Table 7.3: Pragmatic relations of speech and gesture (see Bressem/Ladewig/Müller 2013: 1113)

There is one more important annotation to make in this section: gestures, like language, are multifunctional. It means that gestures can, for instance, assume semantic as well as syntactic functions. This can be seen in the first example of Figure 7.4; the gesture specified the act of opening and assumes the function of an adverb. Which function a gesture can assume and which of the functions is dominant is equally dependent on the context it is used in and its gesture type. Gesture researchers have ascertained that certain types of gestures are suitable for certain communicative purposes. The next section deals with this observation and discusses the typology of gestures from a linguistic perspective.

7.2.2.2   Typology of Gestures

The range of gestural means of expression was described as early as antiquity. Quintilian emphasizes that the abundance of gestural functions comes

very close to that of spoken language. He distinguishes gestures which are linked to individual parts of text, such as the beginning of speech, a narration or argumentation, from gestures which perform speech acts, convey emotions and attitudes, or which are linked to the structure of speech (enumerations, highlighting elements of speech) (Quintilian 1969: 92; cf. Müller 1998: 31–33, Müller/Ladewig/Bressem 2013: 55–56).

The following section is dedicated to exploring different gesture types defined by the degree of conventionalization of gestures. When we examine the degree of conventionalization in gestures, we can distinguish between singular, recurrent, and emblematic gestures (Müller 2010b, 2018). **Singular gestures** are not conventionalized; they embody meanings that refer to the proposition of an utterance. They are produced spontaneously and are indexically connected to the conversational context in which they occur. In contrast, **emblematic gestures** (Ekman/Friesen 1969) exhibit a stable relationship between form and meaning. The Thumbs-up gesture, for instance, bears the meaning of 'ok', 'all is fine', and 'very good'. These gestures can replace speech and substitute words, phrases, or sentences. Alongside singular and emblematic gestures we can also observe gestures which, despite possessing a stable relationship between form and meaning, do not have word status. These are gestures which carry a more schematic meaning which cannot be translated into a certain word or phrase. They return in certain contexts among different speakers and maintain their core forms and meanings. For this reason, these gestures are called **recurrent gestures** (Ladewig 2014b, Harrison/Ladewig 2021).

Figure 7.5: Repertoire of recurrent gestures determined by Bressem & Müller (2014b)

Examples of recurrent gestures are the Palm up open hand (Kendon 2004, Müller 2004, Cooperrider/Abner/Goldin-Meadow 2018), the Brushing aside gesture (Teßendorf 2014) or the Cyclic gesture (Ladewig 2010, 2014c) (see Figure 7.5). Gesture researchers have determined a whole repertoire of recurrent gestures used by German adult speakers (Bressem/Müller 2014b; see Figure 7.5) or Hausa speakers (Will 2021).

Singular, recurrent, and emblematic gestures can perform different functions. This is where we implement Bühler's organon model, which describes the three functions of language (Bühler 1934). These three functions can also be performed by gestures (Müller 1998, 2013). The wealth of expressive possibilities is a crucial condition for hand gestures to develop into signs and is discussed using the term of the 'linguistic potential of gestures' (Müller 2013). Bühler's model encompasses the functions representation (Darstellung), expression (Ausdruck), and appeal (Appell).

When gestures represent something, they create references to the extralinguistic reality. The expressive function conveys emotions, feelings, and attitudes of the speaker. The relation of a gesture to an addressee is created via the appealing function. All three functions can be performed by all three types of gestures. However, at least one of the functions is usually dominant, as we have already seen with the gestural functions with respect to speech in Section 7.2.2.1.

The representational function is dominant in singular gestures. Singular gestures imitate the features of the objects or actions, or portray spatial relations and size proportions. They can represent situations, entities, or actions of the extralinguistic world which are either concrete or abstract (see Chapter 7.1 and Table 7.1). As such they are part of the propositional content of multimodal utterances and often interact with speech on the level of semantics or syntax. The appealing function is dominant in recurrent gestures, as they are located on the interactive level and often relate to an addressee. Recurrent gestures can be used, among other things, to mark parts of an utterance that are relevant to the addressee (discursive function). They can also perform a communicative action (performative function) themselves. Recurrent gestures, therefore, interact on the pragmatic level of speech. No specific function can be assigned to emblems. Emblematic gestures can perform all three functions as a dominant function. Pointing at a watch, for instance, could substitute the utterance *It's late* or *I'm late* and hence embody the propositional content of a spoken utterance. The same gesture could express a dominant appealing function by communicating *Hurry up!*. Furthermore, emblems can serve as evaluative descriptions and thereby perform the expressive function. An example of such a case would be the Cyclic gesture performed on face-height accompanied by a certain facial expression, which can signify 'crazy' (Kendon 2004: 339). Emblems can also perform a function that is not included in the organon model, but which is assumed to exist for linguistic utterances. This function is called performing speech acts, in which gestures function as performative verbs. Examples are the gestures of blessing or making a vow by which the acts of blessing and making a vow are performed (Austin 1962). The gestures do not only represent the performative acts of blessing and making a vow, they actually put them into effect themselves. In this way, they embody the illocutionary power of an utterance, which is often accompanied by performative verbs (cf. Müller 2013).

7.2.3   Summary

- In the analytical process of reconstructing the meaning of gestures, one should begin with the form of the gesture, as the gestural form convey various aspects of meaning that are substantiated and specified via the linguistic utterance.

- Manual movements become gestures when they carry out communicative functions. Four modes of presentation can be used in creating gestures: acting, molding, drawing, and representing.

- Gestures can be spontaneous and be created ad-hoc in the moment of speaking (singular gestures). These gestures frequently convey semantic information such as form, size, spatial relations, and movement. Gestures can also be conventionalized to different degrees (recurrent gestures and emblems). These gestures exhibit a stable form-meaning relation and often fulfil pragmatic functions.

- Gestures can have various relations to speech. The temporal relation describes the temporal co-occurrence of linguistic and gestural units. The functional relation encompasses the functions of gestures on the levels of semantics, syntax, and pragmatics.

7.2.4   Review Questions

1. What does the term 'communicative movement' mean?
2. Why are gestures considered motivated?
3. When regarding linguistic and gestural relations to a single object of discourse, what possible occurrences can arise?
4. What is the pragmatic function of gestures? Give an example.
5. What is meant by 'degree of conventionalization' in gestures? What types of gestures can be distinguished based on this feature?

7.3 Gestures in Foreign Language Classes: Understanding, Memorization, Problem-Solving

Lena Hotze

In the last chapter, you saw the extent to which gestures constitute an important part of human communication and interaction. Question such as 'What is characteristic for a multimodal utterance and how can we categorize it?' were answered and the knowledge gained subsequently implemented practically.

In this last part of the final chapter, we want to elaborate on the practical application of gestures in foreign language classes. We will highlight the benefits of a multimodal implementation in the classroom, and we will focus equally on students and teachers. By presenting case studies and examples, we will show how gestures can be used in terms of cognitive processes such as understanding, memorization, and problem-solving, and how they play a significant role in the teaching situation.

This section is going to show how multimodality i.e. spoken language alongside visible bodily movements, benefits students as well as teachers in the processes of learning and teaching.

Study Goals

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

- implement multimodal utterances as a teaching aide and actively organize lessons
- view gestures as a form of expression in students utterances
- support and promote processes of understanding utilizing gestures
- use multimodal utterances to evoke memories of lexical and grammatical units
- rectify problems and gaps in students' knowledge of terms and language.

7.3.1 Gestures and L2-Acquisition

When viewing language acquisition from a cognitive linguistic perspective, we must take two perspectives into account: the verbal and the gestural. In general, it can be said that the use of gestures in learning and teaching contexts play a greater role in L2 research. Why is that? Gullberg (2014) provides an explicit answer:

> Cross-cutting these broad areas, gesture analysis can shed new light on contexts such as the effect of the other language (transfer or crosslinguistic influence), general effects found in all learners (learner varieties), communication strategies, the role of collaborative processes, classroom practices and assessment, the role of vision, and motor actions for acquisition. (Gullberg 2014: 1869)

Gestures give us the opportunity to gaze into mental processes of the speaker (see Chapter 7.1.3) and receive insight into his or her language level and thereby help teachers promote or expand major teaching subjects.

Studies have shown that L2 learners gesticulate proportionally more in a foreign language than they do in their native tongue (see among others Gullberg 1998, Hadar/Dar/Teitelmann 2001, Stam/McCafferty 2008). While this does not offset the lexical deficit, it supplements the linguistic utterance and supports the conceptualization of what is being said (cf. Cristilli 2014; see among others Gullberg 1998, Alibali/Kita/Young 2000, Goldin-Meadow 2003). Furthermore, gestures can indicate how and to what extent teachers should help their students with linguistic deficits. Graziano & Gullberg (2013) found that the majority of (pragmatic and representational) gestures (see Chapter 7.2) appearing during second language acquisition are located in pauses or interruptions. The learner may expect possible help in terms of lexis from the listener in these pauses.

Gestures appear in a productive learning atmosphere in general. When a teacher uses manual instructions, it encourages students to increase their use of multimodal utterances and partially integrate them into their language repertoire (cf. Gullberg/de Bot/Volterra 2008, Stam/McCafferty 2008). It also aids the understanding process in typical classroom learning scenarios, such as when using audio examples. Kellerman emphasized as early as 1992 that audio examples were more easily elaborated on when

movement sequences were added, thereby removing flaws in identification and understanding. Stam & McCafferty also stress this by making the point that

> [...] the effective use of gesture (and other nonverbal features) by an instructor in a L2 classroom is thought both to create a positive atmosphere and to enhance the possibility of comprehension on the part of students. (Stam/McCafferty 2008: 17)

We would like to start here and show in the following sections how understanding and memorization can be promoted with the help of verbal and gestural utterances. It also circumvents potential problems. This will be done with the aid of existing literature and illustrative examples: firstly, the positive use of multimodal constructions on part of the students will be highlighted, and secondly, a sensibilization of teachers takes place towards the gestures they use themselves.

7.3.2   Understanding

When we speak of understanding, we think of the most basic steps within the classroom. The correct perception and processing of information leads the students to an understanding of the newly acquired language. Over the last 20 years, several research projects were able to show how the use of multimodal utterances simplified processes of recognition and comprehension.

Tellier described so-called **teaching gestures** in her research in 2006. These were gestures which were spontaneously used by the teacher with the intent to support the students. In this scenario, the person teaching acts in a regulating, appraising or explanatory fashion with the help of gestures, facial expressions, and body position. Especially through the use of singular gestures (see Chapter 7.2) the comprehension of movement verbs is aided so that, for instance, the student can determine affiliations in terms of the spoken word or the utterance as a whole.

A typical task for exercising language learners' listening comprehension is the use of audio examples. The learners focus solely on the auditive channel and neglect all visual information. We should ask ourselves to what

extent this format is applicable to everyday interaction. With the exception of phone calls, interactants usually find themselves in situations of audio-visual communication exchanges. Furthermore, visual utterances, i.e. co-speech gestures and facial expressions, can aid in the comprehension of audio examples. Based on a study involving 42 people who watched short descriptive videos under various conditions (1) without any manual and facial stimulation, 2) only facial expressions, 3) hand and facial gestures), Sueyoshi & Hardison (2005) showed that the comprehension improved when the amount of visual information was increased. They also observed that

> [b]ecause note taking was not permitted, gestures, as visual images, likely facilitated memory encoding and subsequent recall of information when participants answered the comprehension questions. (Sueyoshi/Hardison 2005: 677)

These observations show that not only comprehension, but also memorization and information recall were improved.

These findings are confirmed by Sime's results (2006), which stated that gestures and any involvement of body posture or head gestures had a positive impact on the learning of foreign languages. In Sime's study, 22 learners watched a short video segment of their own chat and subsequently rated the physical communicative actions of the person teaching. This was an investigation into the extent to which manual and bodily movements of the teaching person are meaningful to the lesson. Aside from the mental process of information absorption and processing, emotional and interpersonal factors were also noted (cf. Sime 2006: 217). Aside from clarifying, emphasizing, and correcting, the learners also recognized that an engaged and active role increased the students' comprehension; be it through the use of body posture or the teacher's eye contact or head and hand gestures. At the same time, the use of recurrent gestures developed a social organization, (see Chapter 7.2) for example for assigning the right to speak, which is an important aspect of active participation within a class.

> Gestures are thus seen as having the property of supporting comprehension [...]. Learners perceive the two systems of communi-

cation as supporting each other and use both channels of communication to infer meanings. (Sime 2006: 220)

Sime elaborated on her findings in 2008, stating that gestures mainly facilitate comprehension, the learning process, and the responsiveness within the classroom. She also showed which manual utterances are usually utilized in a teaching context.

Sime determined the following common gestures (2008: 265–267):

- representation of words and ideas through the use of abstract and specific referential gestures
- emphasis on important utterances, marking opposition and comparison through recurrent gestures
- detailing time and place through deictic manual usage.

These co-speech gestures are usually performed in a speaker's gestural space and are in the direct field of vision of the students or the audience in general. When a learner is aware of the intent of the verbal expression, gestures are often perceived as confirmation. However, if the learners lack certain knowledge, then the multimodal utterances of the teacher, such as an imitation of an action plus word, can serve as reference points for improving comprehension.

For teachers, this means that they need to pay special attention to manual utterances, as the gestures can reveal the level of the learners' knowledge. Lapses in memory become apparent and the appropriate knowledge can be revisited. Furthermore, the content meaning of a word can be conveyed with gestures when students stumble verbally. In this case the manual implementation serves as input for the students and can point towards its linguistic counterpart.

The important aspect we have just described is the creation of a **common ground** or **intersubjectivity**. With its help, a common social or even cognitive basis can be created in order to, for example, convey new contexts and facts. Nathan & Alibali (2011) emphasize that

[f]or the student, common ground is necessary in order to comprehend the teacher's actions and statements. For the teacher, common ground is necessary in order to connect to students'

prior knowledge and experiences, as well as to interpret and assess students' actions and comments, and to appropriately respond to students' questions. (Nathan/Alibali 2011: 257)

In their study, the two researchers explain that this common ground is mainly invoked by the use of gestures. Gestures are especially helpful for:

- identifying and assuming misunderstandings
- presenting new explanations and representations.

<div align="right">(Nathan/Alibali 2011: 257)</div>

Gestures can, therefore, be viewed as a 'repair tool' as well as a visual connection between old and new knowledge. Especially recurrent types of gestures with deictic and performative functions play separate roles, such as the Index finger (Nathan/Alibali 2011: 263) or the Palm up open hand (Müller 2004). These gestures direct the attention and additionally act as a conceptual connection between known and unfamiliar content and words.

We would like to firmly note at this point, that the index finger is neither a 'primitive' nor a 'simple' gesture, as it may often appear. This gesture can be used in a complex multimodal scenario to constructively guide interactions and instructions. The verbal and gestural use of pointing, such as with the adverb *Here!* while pointing at the blackboard (see Figure 7.6) not only creates a common reference point but elaborates at the same time. In her article *Pointing, talk, and bodies* (2014), Mondada specifies on how the pointing gesture participates in a **complex multimodal gestalt**, which is defined by its systematic and dynamic resources amidst an interaction. Meaning, apart from language and gesture, gaze and body posture should, therefore, also be integrated in to teaching communication to refer to things or emphasize them.
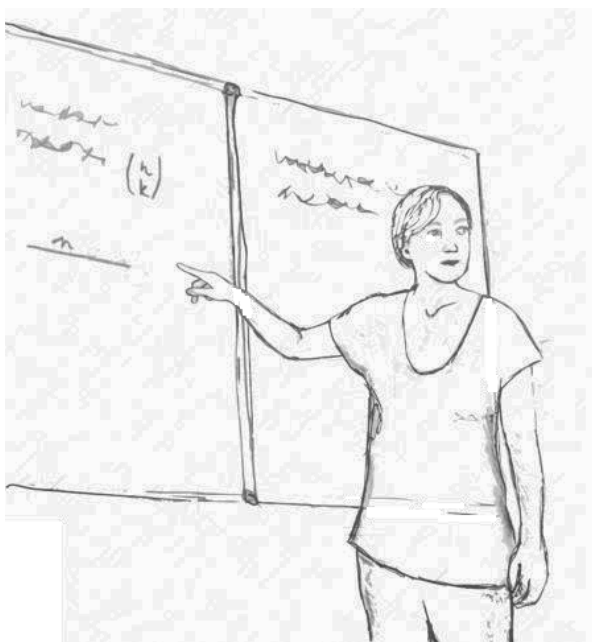
Figure 7.6: Multimodal reference (*Here!* plus Pointing gesture) to the blackboard (own illustration)

7.3.3 Memorization

For students and their usage of co-speech gestures, the bodily medium plays a significant role for the memorization process. Goldin-Meadow, Nusbaum, Kelly & Wagner stressed in their study (2001) that gestures are a crucial factor for remembering. Children as well as adults profit from manual use and activate more words; this suggests that gesturing during spoken utterances reduces the speaker's cognitive burden. In this case, the multimodal usage not only reflects the student's current status of knowledge; it also divides and reshapes the cognitive resources productively.

While it is vital how gestures are perceived, it is also important how a learner produces them. Morett, Gibbs & MacWhinney (2012: 778) emphasize this aspect in their study which "is consistent with work showing that gesture enactment enhances L2 word learning more effectively than gesture viewing". The use of manual utterances in any form – in other words,

utterances of a deictic, discursive, or referential nature – influence the process of memorization in foreign language acquisition positively.

A recent study by Hupp & Gingras (2016) confirms that the use of iconic gestures benefits the memorization of vocabulary. Therefore, the use of multimodal utterances is not solely for the benefit of the teacher, but also indispensable to the learner. It does not matter whether we speak about actions or objects, it is the frequency of the multimodal utterance that is crucial. The regular use of semantically identical gestures alongside language by teachers and students increases the acquisition and memorization of vocabulary (Hupp/Gingras 2016: 354).

The gestures of the teacher serve as mnemonic devices for the student. The combination of verbal and gestural utterances explicitly illustrates words and even whole ideas and create a connection between the physical execution and a lexical or grammatical fact. An example would be the positioning of tenses such as past tense and future to the left and the right in gesture space (see Figure 7.7).

Figure 7.7: Gestural positioning of lexical and/or grammatical units in gesture space (own illustration)

7.3.4   Problem-Recognition and -Solving

Problem-recognition and problem-solving are important components of foreign language acquisition alongside understanding and memorization.

Teachers and students can both profit from the use of multimodal utterances to decipher and prevent difficulties.

Gullberg (1998, 2006) implies that gestures can compensate and reduce lexical gaps while speaking. In comparison to the L1 language, the usage of gestures increases during L2 use; this may reflect the growing difficulties within a conversation (also see Gullberg 1998). In part, gestures can bridge gaps and disruptions in the speech flow, for instance when the speaker is searching for a word. Alleviation of the cognitive burden also appears when time specifications are made through deictic localization on an imaginary timeline within a person's gestural space to present past, current, and future circumstances (Gullberg 2006: 111–112).

To reduce difficulties with respect to the learning materials, teachers use visualizations to convey the educational content more clearly and vividly. They switch into a teaching diction, which is characterized by simplified utterances and an increased use of gestures. Gullberg (2006) describes the didactical procedure as follows:

> Learners are not alone in using gestures as scaffolding. A number of studies have shown that the simplified registers used by NSs [Native Speakers – note from the author] and teachers, known as Foreigner Talk […] and Teacher Talk […], are characterised by an increased use of representational gestures (iconics and deictic gestures), but also of more rhythmic, beat-like movements […]. This last feature may be typical of a "didactic" mode. (Gullberg 2006: 112)

An additional phenomenon that yields insights into the understanding and cognitive state of the learners are **gesture-speech mismatches** (for more in-depth observations, see for example Goldin-Meadow 2006, 2007). Different types of information can be presented via speech and gestures, especially in explanations and narrations. Imagine that a student is recounting an event in which he or she was rudely bumped into on the bus. While he or she mentions a little bump, it is evident in his or her gestures that he or she was violently pushed aside. This example depicts an inaccurate representation of the situation. The physical reenactment shows the accurate situation, which is downplayed and inaccurately represented in the spoken narration, for instance due to the missing word. Gesture-speech mis-

matches appear regularly in classrooms and illustrate how divergent (or even faulty) information can be conveyed in two modalities. While we know of various strategies for solving problems or ways of explaining a topic, the verbal and manual or rather bodily form of communication always needs to be considered. This is where you can start and support your students with tasks and instructions, especially those that have difficulties in expressing themselves fluently and accurately. Goldin-Meadow (2007: 229) also emphasizes that manual instructions can provide decisive impetus for finding the solution and perhaps even serve as a frame for realization to finally successfully complete a task.

When we regard neighbouring disciplines such as mathematics, we can also observe the usage of co-speech gestures for problem-solution, which can also be used for foreign language acquisition. In her article from 2011, Gerofsky writes that it should be a goal to actively shape the lessons instead of executing them exclusively verbally. Multimodal implementation is meant to improve teaching and learning by using gestures as tools for analysis and diagnosis and, ultimately, to use gestures to influence knowledge positively (2011: 247). The size and shape of gestures play a crucial role, which Gerofsky explains as follows:

> Rather, these more traditional methods ought to be supplemented by elicited large, close-up gestures, especially in the initial stages of teaching mathematical functions. Gestural work is not sufficient on its own, but when accompanied by focused teaching that helps make salient feature of graphs visual, kinesthetic and audible, gesture can play an important role as both a mode of expression and an experiential learning resource. (Gerofsky 2011: 254)

Even though she argues from a mathematical perspective, these are all points that can be applied to language teaching as well. Language teachers also have to reassess and modify their teaching methods. Lessons should always be actively executed, meaning that head, upper body, and hands should also be an important part of interaction, in order to, for instance, illustrate and eliminate difficulties in comprehension (see Figure 7.8).
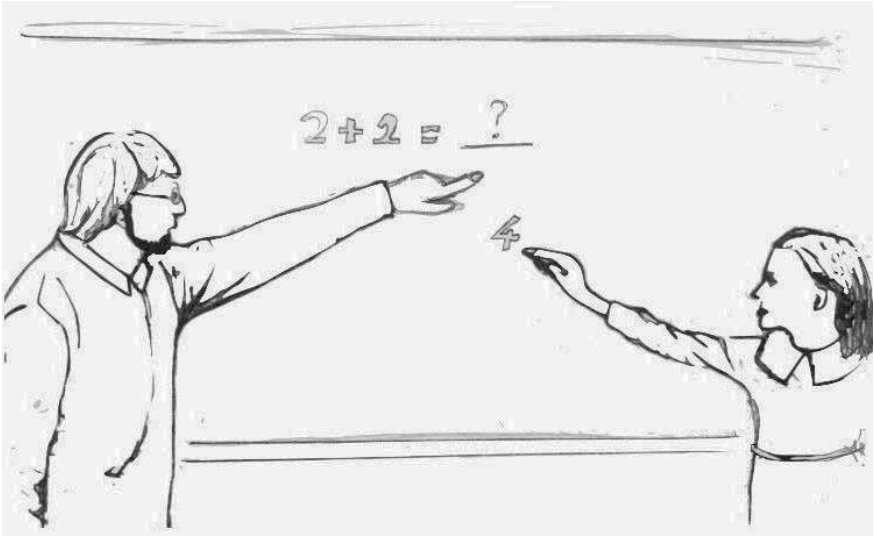
Figure 7.8: Interactive exchange with student (own illustration)

Experiment

We will now conduct an experiment to illustrate the cognitive processes we described above. Choose a conversation of about five minutes (for instance from a video on YouTube) and play only the audio at first. Then add the audio-visual component. Verify with a short test the extent of understanding and memorization under the respective conditions. Set yourself tasks to test the processes of understanding and memorization.

7.3.5 Summary

- Gestures should be viewed as a medium of expression of the learner. They grant insights into the speaker's thoughts as well as their language levels and in this way are an indication of how teaching content could be improved.

- Lexical deficits, additions to conceptualizations and verbal utterances are being visually presented.

- Co-speech gestures make it easier to comprehend processes of understanding. They also promote memorization and aid in problem-solving in relation to utterances.

- Within the classroom, gestural feedback facilitates the learning process. Language, gestures, gaze, and body posture should be integrated into a teacher's interaction. It helps when referring to things and/or emphasizing them. Aside from repair work, multimodal utterances also offer a visual connection between old and new knowledge.

- Learners profit in their memorization processes from the additional use of manual utterances. They activate more words because gesticulation while speaking reduces the learner's cognitive burden. In this way, resources are divided and reshaped productively.

7.3.6   Review Questions

1.   Name 5 arguments which speak for implementing gestures into language teaching.

2.   To what extent do gestures influence the learning atmosphere?

3.   What difficulties arise with the use of audio examples and how can they be remedied?

4.   In the learning situation, referential, recurrent, and deictic gestures are used. What are the respective contexts in which they are implemented?

5.   Where does the use of manual utterances on the part of the students play an important role?

6.   Why does an increased use of gestures take place and how does it aid in the use of the L2? To what extent can gestures serve in problem-solving processes during language teaching?

References

Ainsworth, S. (1999). The functions of multiple representations. *Computers & Education* 33, 131–152.

Alibali, M. W./Kita, S./Young, A. J. (2000). Gesture and the process of speech production: We think, therefore we gesture. *Language and Cognitive Processes* 15: 6, 593–613.

Allen, K./Pereira, F./Botvinick, M./Goldberg, A. E. (2012). Distinguishing grammatical constructions with fMRI pattern analysis. *Brain and Language* 123: 3, 174–182.

Ambridge, B. (2020a). Against stored abstractions: A radical exemplar model of language acquisition. *First Language* 40: 5–6, 509–559.

Ambridge, B. (2020b). Abstractions made of exemplars or 'You're all right, and I've changed my mind': Response to commentators. *First Language* 40: 5–6, 640–659.

Armstrong, D. F./Wilcox, S. E. (2007). *The Gestural Origin of Language*. Oxford, New York: Oxford University Press.

Austin, J. L. (1962). *How to Do Things with Words*. Oxford: Clarendon University Press.

Backus, A./Dorleijn, M. (2010). Loan translations versus code-switching. In: Bullock, B. E./Toribio, A. J. (Eds.), *The Cambridge Handbook of Linguistic Code-Switching*. Cambridge: Cambridge University Press, 75–93.

Baldo, J. V./Dronkers, N. F./Wilkins, D./Ludy, C./Raskin, P./Kim, J. (2005). Is problem solving dependent on language? *Brain and Language* 92: 3, 240–250.

Barðdal, J. (2008). *Productivity: Evidence from Case and Argument Structure in Icelandic*. Amsterdam, Philadelphia: John Benjamins.

Baron, I. (2014). *Die Metapher im Kontext einer allgemeinen Symboltheorie. Systemtheoretische Überlegungen im Ausgang von Nelson Goodman und deren Konsequenzen für die Philosophie.* Berlin, Boston: De Gruyter.

Bates, E./Goodman, J. C. (2001). On the inseparability of grammar and the lexicon: Evidence from acquisition, aphasia and real time processing. In: Tomasello, M./Bates, E. (Eds.), *Language Development: The Essential Readings*. Malden, MA: Blackwell Publishers, 134–162 (Reprinted from *Language and Cognitive Processes* (1997) 12, 507–586).

Behrens, H. (2003). Verbal prefixation in German child and adult language. *Acta Linguistica Hungarica* 50, 37–55.

Behrens, H. (2006). The input-output relationship in first language acquisition. *Language and Cognitive Processes* 21: 1–3, 2–24.

Behrens, H. (2009). Usage-based and emergentist approaches to language acquisition. *Linguistics* 47: 2, 383–411.

Behrens, H. (2011). Erstspracherwerb. In: Hoffman, L./Quasthoff, U. (Eds.), *Die Matrix der menschlichen Entwicklung*. Berlin: De Gruyter, 252–273.

Behrens, H./Pfänder, S. (2013). Die Entstehung von Sprache. In: Auer, P. (Ed.), *Sprachwissenschaft: Grammatik – Interaktion – Kognition*. Stuttgart, Weimar: J. B. Metzler, 319–346.

Beißner, K. (2002). *I see what you mean. Metaphorische Konzepte in der (fremdsprachlichen) Bedeutungskonstruktion*. Frankfurt/Main, New York: Peter Lang.

Bellavia, E. (2007). *Erfahrung, Imagination und Sprache. Die Bedeutung der Metaphern der Alltagssprache für das Fremdsprachenlernen am Beispiel der deutschen Präpositionen*. Tübingen: Narr.

Bergen, B. K. (2012). *Louder than Words: The New Science of How the Mind Makes Meaning*. New York: Basic Books.

Bergen, B. K./Chang, N. (2013). Embodied Construction Grammar. In: Hoffmann, T./Trousdale, G. (Eds.), *The Oxford Handbook of Construction Grammar*. Oxford, New York: Oxford University Press, 168–190.

Berlin, B./Kay, P. (1969). *Basic Color Terms: Their Universality and Evolution*. Berkeley, Los Angeles: University of California Press.

Bernardini, P./Schlyter, S. (2004). Growing syntactic structure and code-mixing in the weaker language: The ivy hypothesis. *Bilingualism: Language and Cognition* 7, 49–69.

Betrancourt, M. (2005). The Animation and Interactivity Principles in Multimedia Learning. In: Mayer, R. E. (Ed.), *The Cambridge Handbook of Multimedia Learning*. Cambridge: Cambridge University Press, 287–296.

Bhatt, R. M./Bolonyai, A. (2011). Code-Switching and the Optimal Grammar of Bilingual Language Use. *Bilingualism: Language and Cognition* 14: 4, 522–546.

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.

Bierwisch, M. (1971). *Modern Linguistics: Its Development, Methods and Problems*. The Hague: Mouton.

Birdwhistell, R. L. (1970). *Kinesics and Context: Essays on Body Motion Communication*. Philadelphia, University of Pennsylvania Press.

Black, M. (1962). *Models and Metaphors: Studies in Language and Philosophy*. Ithaca, New York: Cornell University Press.

Blomberg, J. (2015). The expression of non-actual motion in Swedish, French and Thai. *Cognitive Linguistics* 26: 4, 657–696.

Bloomfield, L. (1935). *Language*. London: Allen and Unwin.

Blühdorn, H./Foschi Albert, M. (2012). *Leseverstehen für Deutsch als Fremdsprache: Ein Lehrbuch für die Lehrerausbildung*. Pisa: Pisa University Press.

Boas, H. C. (2003). *A Constructional Approach to Resultatives*. Stanford, CA: CSLI.

Boas, H. C. (2005). Determining the Productivity of Resultative Constructions: A Reply to Goldberg & Jackendoff. *Language* 81: 2, 448–464.

Boas, H. C. (2010). Comparing constructions across languages. In: Boas, H. C. (Ed.), *Contrastive Studies in Construction Grammar*. Amsterdam, Philadelphia: John Benjamins, 1–20.

Boas, H. C. (2013). Cognitive construction grammar. In: Hoffmann, T./Trousdale, G. (Eds.). *The Oxford Handbook of Construction Grammar*. Oxford: Oxford University Press, 233–252.

Boas, H. C. (2014). Zur Architektur einer konstruktionsbasierten Grammatik des Deutschen. In: Lasch, A./Ziem, A. (Eds.), *Grammatik als Netzwerk von Konstruktionen. Sprachwissen im Fokus der Konstruktionsgrammatik*. Berlin: De Gruyter, 37–64.

Bolinger, D. (1983). Intonation and gesture. *American Speech* 58: 2, 156–174.

Boroditsky, L. (2001). Does language shape thought? Mandarin and English Speakers' Conceptions of Time. *Cognitive Psychology* 43: 1, 1–22.

Boroditsky, L./Fuhrman, O./McCormick, K. (2011). Do English and Mandarin speakers think about time differently? *Cognition* 118: 1, 123–129.

Boroditsky, L./Schmidt, L. A./Phillips, W. (2003). Sex, syntax, and semantics. In: Gentner, D./Goldin-Meadow, S. (Eds.), *Language in Mind: Advances in the Study of Language and Thought*. Cambridge, MA: MIT Press.

Bosch, L./Sebastián-Gallés, N. (2001). Early language differentiation in bilingual infants. In: Cenoz, J./Genesee, F. (Eds.), *Trends in Bilingual Acquisition.* Amsterdam, Philadelphia: John Benjamins, 71–93.

Bowerman, M. (1977). The acquisition of word meaning: An investigation of some current concepts. In: Johnson-Laird, P. N./Wason, P. C. (Eds.), *Thinking: Readings in Cognitive Science.* Cambridge: Cambridge University Press, 239–253.

Boyd, J. K./Goldberg, A. E. (2011). Learning What NOT to Say: The Role of Statistical Preemption and Categorization in A-Adjective Production. *Language* 87: 1, 55–83.

Bressem, J. (2013). A linguistic perspective on the notation of form features in gestures. In: Müller, C./Cienki, A./Fricke, E./Ladewig, S. H./McNeill, D./Teßendorf, S. (Eds.), *Body – Language – Communication: An International Handbook on Multimodality in Human Interaction,* Vol. 1. Berlin, Boston: De Gruyter Mouton, 1079–1098.

Bressem, J. (2014). Repetitions in gesture. In: Müller, C./Cienki, A./Fricke, E./Ladewig, S. H./McNeill, D./Bressem, J. (Eds.), *Body – Language – Communication. An International Handbook on Multimodality in Human Interaction*, Vol. 2. Berlin, Boston: De Gruyter Mouton, 1641–1649.

Bressem, J. (2021). *Repetitions in Gesture: A Cognitive-Linguistic and Us-age-Based Perspective*. Berlin, Boston: De Gruyter Mouton.

Bressem, J./Ladewig, S. H. (2011). Rethinking gesture phases: Articulatory features of gestural movement? *Semiotica* 184, 53–91.

Bressem, J./Ladewig, S. H./Müller, C. (2013). A linguistic annotation system for gestures. In: Müller, C./Cienki, A./Fricke, E./Ladewig, S. H./McNeill, D./Teßendorf, S. (Eds.), *Body – Language – Communication. An International Handbook on Multimodality in Human Interaction*, Vol 1. Berlin, Boston: De Gruyter Mouton, 1098–1124.

Bressem, J./Müller, C. (2014a). The family of AWAY gestures: Negation, refusal, and negative assessment. In: Müller, C./Cienki, A./Fricke, E./Ladewig, S. H./McNeill, D./Bressem, J. (Eds.), *Body – Language – Communication. An International Handbook on Multimodality in Human Interaction*, Vol. 2. Berlin, Boston: De Gruyter Mouton, 1592–1604.

Bressem, J./Müller, C. (2014b). A repertoire of German recurrent gestures with pragmatic functions. In: Müller, C./Cienki, A./Fricke, E./Ladewig, S. H./McNeill, D./Bressem, J. (Eds.), *Body – Language – Communication: An International Handbook on Multimodality in Human Interaction*, Vol. 2. Berlin, Boston: De Gruyter Mouton, 1575–1592.

Brown, D. E./Clement, J. (1989). Overcoming misconceptions via analogical reasoning: abstract transfer versus explanatory model construction. *Instructional Science* 18: 4, 237–261.

Brugman, C. (1988). *The Story of Over: Polysemy, Semantics, and the Structure of the Lexicon*. New York: Garland.

Brugman, C./Lakoff, G. (1988). Cognitive typology and lexical networks. In: Small, S. L./Cottrell, G. W./Tannenhaus, M. K. (Eds.)*, Lexical Ambiguity Resolution*. San Mateo, CA: Morgan Kaufman, 477–507.

Brugman, C./Lakoff, G. (2006). Radial network: Cognitive topology and lexical networks. In: Geeraerts, D. (Ed.), *Cognitive Linguistics*: *Basic Readings*. Berlin, New York: Mouton De Gruyter, 109–140.

Brünner, G. (1987). Metaphern für Sprache und Kommunikation in Alltag und Wissenschaft. *Diskussion Deutsch* 18, 100–119.

Bühler, K. (1934). *Sprachtheorie. Die Darstellungsfunktion der Sprache*. Jena: Fischer.

Burenhult, N. (2006). Body part terms in Jahai. *Language Sciences* 28, 162–180.

Bußmann, H. (1996). *Routledge Dictionary of Language and Linguistics*. Translated and edited by G. Trauth and K. Kazzazi. London: Routledge.

Bußmann, H. (2008). *Lexikon der Sprachwissenschaft* (4. Aufl.). Stuttgart: Kröner.

Butterworth, B./Hadar, U. (1989). Gesture, speech, and computational stages: A reply to McNeill. *Psychological Review* 96: 1, 168–174.

Bybee, J. L. (1995). Regular morphology and the lexicon. *Language and Cognitive Processes* 10: 5, 425–455.

Bybee, J. L. (2006). From usage to grammar: The mind's response to repetition. *Language* 82: 4, 711–733.

Bybee, J. L. (2010). *Language, Usage, and Cognition*. Cambridge, New York: Cambridge University Press.

Calbris, G. (1990). *The Semiotics of French Gestures*. Bloomington: Indiana University Press.

Calbris, G. (2011). *Elements of Meaning in Gesture*. Amsterdam, Philadelphia: John Benjamins.

Carroll, J. B. (Ed.) (1956). *Language, Thought, and Reality*: *Selected Writings of Benjamin Lee Whorf.* Cambridge, MA: MIT Press.

Casasanto, D./Jasmin, K. (2012). The hands of time: Temporal gestures in English speakers. *Cognitive Linguistics* 23: 4, 643–674.

Chen, J.-Y. (2007). Do Chinese and English speakers think differently about time? Failure of replicating Boroditsky (2001). *Cognition* 104: 2, 427–436.

Chilla, S. (2011). Bilingualer Spracherwerb. In: Siegmüller, J./Bartels, H. (Eds.), *Leitfaden Sprache – Sprechen – Schlucken – Stimme*. München: Elsevier, 46–51.

Chomsky, N. (1959). Review of B. F. Skinner's "Verbal Behavior". *Language* 35: 1, 26–58.

Chomsky, N. (1965). *Aspects of the Theory of Syntax*. Cambridge, MA: MIT Press.

Chomsky, N. (1972). *Language and Mind*. San Diego: Harcourt Brace Jovanovich.

Chomsky, N. (1977). *Essays on Form and Interpretation*. New York: North-Holland.

Chomsky, N. (1981). *Lectures on Government and Binding: The Pisa Lectures*. Holland: Foris Publications.

Chomsky, N. (1986). *Knowledge of Language: Its Nature, Origin, and Use*. New York: Praeger.

Chomsky, N. (1989). *Rules and Representations* (2nd ed.). Oxford: Blackwell (Original work published 1980).

Chomsky, N. (1995). *The Minimalist Program*. Cambridge, MA: MIT Press.

Chomsky, N. (2000). *New Horizons in the Study of Language and Mind*. Cambridge: Cambridge University Press.

Chomsky, N. (2007). *New Horizons in the Study of Language and Mind* (7th ed.). Cambridge: Cambridge University Press (Original work published 2000).

Chomsky, N./Lasnik, H. (1993). The Theory of Principles and Parameters. In: Jacobs, J./von Stechow, A./Sternefeld W./Vennemann, T. (Eds.), *1. Halbband: An International Handbook of Contemporary Research*. Berlin, New York: De Gruyter Mouton, 506–569.

Chomsky, N./Lightfood, D. W. (2002). *Syntactic Structures* (2nd ed.). Berlin, New York: Mouton De Gruyter (Original work published 1957).

Cienki, A. (1998). Metaphoric gestures and some of their relations to verbal metaphorical expressions. In: König, J.-P. (Ed.), *Discourse and Cognition: Bridging the Gap*. Stanford, CA: CSLI, 189–204.

Cienki, A./Müller, C. (2008). Metaphor, gesture, and thought. In: Gibbs, R. W. (Ed.), *The Cambridge Handbook of Metaphor and Thought*. Cambridge: Cambridge University Press, 483–501.

Cletiu, A. (1997). Bemerkungen zur semantischen und konzeptuellen Struktur des kognitiven Weltmodels. *Zeitschrift der Germanisten Rumäniens* 6: 1–2 (11–12), 35–37.

Collins, A./Brown, J. S./Larkin, K. M. (1980). Inference in text under-standing. In: Spiro, R./Bruce, B./Brewer, W. (Eds.), *Theoretical Issues in Reading Comprehension: Perspectives from Cognitive Psychology, Linguistics, Artificial Intelligence, and Education*. Hillsdale, NJ: Lawrence Erlbaum, 385–407.

Condon, W. S./Ogston, W. D. (1966). Sound film analysis of normal and pathological behavior patterns. *The Journal of Nervous and Mental Disease* 143: 4, 338–347.

Condon, W. S./Ogston, W. D. (1967). A segmentation of behavior. *Journal of Psychiatric Research* 5: 3, 221–235.

Cook, V. J./Newson, M. (1998). *Chomsky's Universal Grammar: An Introduction* (2nd ed.). Oxford: Blackwell (Original work published 1991).

Cooperrider, K./Abner, N./Goldin-Meadow, S. (2018). The palm-up puzzle: meanings and origins of a widespread form in gesture and sign [Review]. *Frontiers in Communication* 3, 23, 1–16.

Cristilli, C. (2014). How gestures help children to track reference in narrative. In: Seyfeddinipur, M./Gullberg, M. (Eds.), *From Gesture in Conversation to Visible Action as Utterance*. Amsterdam, Philadelphia: John Benjamins, 331–350.

Croft, W. (2001). *Radical Construction Grammar: Syntactic Theory in Typological Perspective*. Oxford, New York: Oxford University Press.

Croft, W. (2003). *Typology and Universals: Second Edition*. Cambridge, UK: Cambridge University Press.

Croft, W. (2013). Radical construction grammar. In: Hoffmann, T./Trousdale, G. (Eds.), *The Oxford Handbook of Construction Grammar*. Oxford, New York: Oxford University Press, 211–232.

Croft, W./Cruse, D. A. (2004). *Cognitive Linguistics*. Cambridge, New York: Cambridge University Press.

Dąbrowska, E. (2010). The mean lean grammar machine meets the human mind: Empirical investigations of the mental status of rules. In: Schmid, H.-J./Handl, S. (Eds.), *Cognitive Foundations of Linguistic Usage Patterns: Empirical Approaches*. Berlin, New York: De Gruyter Mouton, 151–170.

de Bot, K. (2004). The multilingual lexicon: Modelling selection and control. *The International Journal of Multilingualism* 1: 1, 17–32.

de Bot, K./Lowie, W./Verspoor, M. (2007). A dynamic systems theory approach to second language acquisition. *Bilingualism: Language and Cognition* 10: 1, 7–21.

de Saussure, F. (1969). *Cours de Linguistique Générale* (16th ed.). Paris: Payot (Original work published 1916).

de Saussure, F. (1983). *Course in General Linguistics*. Edited by Ch. Bally and A. Sechehaye with the collaboration of A. Riedlinger. Translated and annotated by R. Harris. London: Duckworth.

de Saussure, F. (2001). *Grundfragen der allgemeinen Sprachwissenschaft* (3. Aufl.). Herausgegeben von Ch. Bally und A. Sechehaye. Berlin, New York: De Gruyter.

DeCasper, A. J./Lecanuet, J.-P./Busnel, M.-C./Granier-Deferre, C./Maugeais, R. (1994). Fetal reactions to recurrent maternal speech. *Infant Behavior & Development* 17: 2, 159–164.

Deppermann, A. (2002). Von der Kognition zur verbalen Interaktion: Bedeutungskonstitution im Kontext aus Sicht der Kognitionswissenschaften und der Gesprächsforschung. In: Deppermann, A./Spranz-Fogasy, T. (Eds.), *Be-deuten: Wie Bedeutung im Gespräch entsteht*. Tübingen: Stauffenburg, 11–33.

Diessel, H. (2004). *The Acquisition of Complex Sentences*. Cambridge, New York: Cambridge University Press.

Diessel, H. (2016). Frequency and lexical specificity in grammar: A critical review. In: Behrens, H./Pfander, S. (Eds.), *Experience Counts: Frequency Effects in Language*. Berlin, Boston: De Gruyter Mouton, 209–237.

Diessel, H. (2023). *The Constructicon: Taxonomies and Networks* (Elements in Construction Grammar). Cambridge: Cambridge University Press.

Dijkstra, T./Grainger, J./van Heuven, W. J. B (1999). Recognition of cognates and interlingual homographs: The neglected role of phonology. *Journal of Memory and Language* 41: 4, 496–518.

Dik, S. C. (1997). *The Theory of Functional Grammar: Part 1: The Structure of the Clause* (2nd rev. ed., edited by Kees Hengeveld). Berlin, New York: Mouton De Gruyter.

Dimroth, C./Haberzettl, S. (2008). Je älter desto besser. Lernen Kinder Deutsch als Zweitsprache schneller als Deutsch als Erstsprache?. In: Ahrenholz, B./Bredel, U./Klein, W./Rost-Roth, M./Skiba, R. (Eds.), *Empirische Forschung und Theoriebildung: Beiträge aus Soziolinguistik, Gesprochene-Sprache- und Zweitspracherwerbsforschung: Festschrift für Norbert Dittmar zum 65. Geburtstag*. Frankfurt/Main u.a.: Peter Lang, 227–239.

Donald, M. (1991). *Origins of the Modern Mind: Three Stages in the Evolution of Culture and Cognition*. Cambridge, MA, London: Harvard University Press.

Donalies, E. (2011). *Basiswissen Deutsche Wortbildung* (2. Aufl.). Tübingen u.a.: Francke.

Drewer, P. (2003). *Die kognitive Metapher als Werkzeug des Denkens. Zur Rolle der Analogie bei der Gewinnung und Vermittlung wissenschaftlicher Erkenntnisse*. Tübingen: Narr.

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.

Dudenredaktion (1999). *Das große Wörterbuch der deutschen Sprache in 10 Bänden*. Mannheim u.a.: Dudenverlag.

Dudenredaktion (2017a). *Baum* [http://www.duden.de/rechtschreibung/Baum, 8. August 2017].

Dudenredaktion (2017b). *Apfelbaum* [http://www.duden.de/rechtschreibung/Apfelbaum, 8. August 2017].

Dudenredaktion (2017c). *Lorbeer* [http://www.duden.de/rechtschreibung/Lorbeer, 8. August 2017].

Dudenredaktion (2017d). *aufbaumen* [http://www.duden.de/rechtschreibung/aufbaumen, 8. August 2017].

Dudenredaktion (2017e). *baumartig* [http://www.duden.de/rechtschreibung/baumartig, 8. August 2017].

Dudenredaktion (2017f). *Käse* [http://www.duden.de/rechtschreibung/Kaese, 8. August 2017].

Dudenredaktion (2017g). *schneiden* [http://www.duden.de/rechtschreibung/schneiden, 8. August 2017].

Dürscheid, C. (2012). *Syntax: Grundlagen und Theorien* (6. aktual. Aufl.). Göttingen: Vandenhoeck & Ruprecht.

DWDS (2017a). *Papier* [https://www.dwds.de/wb/Papier, 5. August 2017].

DWDS (2017b). https://www.dwds.de/wb/leiten, Lemma: *leiten* [7. August 2017].

Efron, D. (1972). *Gesture, Race and Culture. A Tentative Study of Some of the Spatio-Temporal and "Linguistic" Aspects of the Gestural Behavior of Eastern Jews and Southern Italians in New York City, Living under Similar as well as Different Environmental Conditions*. The Hague, Paris: Mouton (Original work published 1941).

Eichinger, L. M. (2000). *Deutsche Wortbildung. Eine Einführung*. Tübingen: Narr.

Ekman, P./Friesen, W. V. (1969). The repertoire of nonverbal behavior: Categories, origins, usage, and coding. *Semiotica* 1: 1, 49–98.

Elman, J. L. (1993). Learning and development in neural networks: The importance of starting small. *Cognition* 48: 1, 71–99.

Enfield, N. J. (2006). Lao body part terms. *Language Sciences* 28: 2, 181–200.

Enfield, N. J./Majid, A./van Staden, M. (2006). Cross-linguistic categorisation of the body: Introduction. *Language Sciences* 28: 2, 137–147.

Engelkamp, J./Pechmann, T. (1993). Kritische Anmerkungen zum Begriff der mentalen Repräsentation. In: Engelkamp, J. (Ed.), *Mentale Repräsentation*. Bern u.a.: Huber, 7–16.

Engelkamp, J./Zimmer, H. D. (2006). *Lehrbuch der kognitiven Psychologie*. Göttingen: Hogrefe.

Engemann, H./Harr, A.-K./Hickmann, M. (2012). Caused motion events across languages and learner types: A comparison of bilingual first and adult second language acquisition. In: Filipović, L./Jaszczolt, K. M. (Eds.), *Space and Time in Languages and Cultures: Linguistic Diversity*. Amsterdam, Philadelphia: John Benjamins, 263–288.

Engle, R. A. (2000). *Toward a Theory of Multimodal Communication Combining Speech, Gestures, Diagrams, and Demonstrations in Instructional Explanations.* Stanford, CA: Stanford University.

Evans, N./Levinson, S. C. (2009). The myth of language universals: Language diversity and its importance for cognitive science. *Behavioral and Brain Sciences* 32: 5, 429–448.

Evans, V. (2007). *A Glossary of Cognitive Linguistics*. Edinburgh: Edinburgh University Press.

Evans, V. (2012). Cognitive linguistics. *Wiley Interdisciplinary Reviews: Cognitive Science* 3: 2, 129–141.

Evans, V./Green, M. (2006). *Cognitive Linguistics. An Introduction*. Edinburgh: Edinburgh University Press.

Everett, D. L. (2005). Cultural constraints on grammar and cognition in Pirahã: Another look at the design features of human language. *Current Anthropology* 46: 4, 621–646.

Fanselow, G. (2002). Wie ihr Gebrauch die Sprache prägt. In: Krämer, S./König, E. (Eds.), *Gibt es eine Sprache hinter dem Sprechen?* Frankfurt/Main: Suhrkamp, 229–261.

Fauconnier, G./Turner, M. (1995). Conceptual integration and formal expression. *Metaphor and Symbolic Activity* 10: 3, 183–204.

Fauconnier, G./Turner, M. (1998). Conceptual integration networks. *Cognitive Science* 22: 2, 133–187.

Fauconnier, G./Turner, M. (2008). *The Way We Think: Conceptual Blending and the Mind's Hidden Complexities*. New York: Basic Books.

Feyereisen, R. (1987). Gestures and speech, interactions and separations: A reply to McNeill (1985). *Psychological Review* 94: 4, 493–498.

Fikkert, P./de Hoop, H. (2009). Language acquisition in optimality theory. *Linguistics* 47: 2, 311–357.

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.

Fischer, K./Stefanowitsch, A. (Eds.) (2008). *Konstruktionsgrammatik. Von der Anwendung zur Theorie* (2., überarb. Aufl.). Tübingen: Stauffenburg.

Fleischer, W./Barz, I. (2012). *Wortbildung der deutschen Gegenwarts-sprache*. Berlin, Boston: De Gruyter.

Forceville, C. (2012). Pictorial runes in "Tintin and the Picaros". *Journal of Pragmatics* 43: 3, 875–890.

Foschi Albert, M. (2012). Lesestrategien zur Ermittlung der Textkohärenz in fremdsprachigen Texten. *Zeitschrift für interkulturellen Fremd-sprachenunterricht* 17: 1, 25–39.

Foschi Albert, M./Hepp, M. (2012). Zusammenrückungen / conglomerati – ein vergleichender Blick auf die deutsche und italienische Sub-stantivkomposition. In: Cinato, L./Costa, M/Ponti, D./Ravetto, M. (Eds.)*, Intrecci di Lingua e Cultura. Studi in Onore di SBC*. Rom: Aracne, 111–139.

Freudenthal, D./Pine, J. M./Aguado-Orea, J./Gobet, F. (2007). Modeling the developmental patterning of finiteness marking in English, Dutch, German, and Spanish using MOSAIC. *Cognitive Science* 31: 2, 311–341.

Fricke, E. (2007). *Origo, Geste und Raum – Lokaldeixis im Deutschen*. Berlin, New York: De Gruyter.

Fricke, E. (2012). *Grammatik multimodal: Wie Wörter und Gesten zusam-menwirken.* Berlin, Boston: De Gruyter.

Fried, M./Östman, J.-O. (2004). Construction Grammar: A thumbnail sketch. In: Fried, M./Östman, J.-O. (Eds.), *Construction Grammar in a Cross Language Perspective.* Amsterdam, Philadelphia: John Benjamins, 11–86.

Gardner-Chloros, P. (2009). *Code-Switching*. Cambridge: Cambridge University Press.

Gathercole, V. C. M./Hoff, E. (2007). Input and the Acquisition of Language: Three Questions. In: Hoff, E./Shatz, M. (Eds.), *Blackwell Handbook of Language Development.* Oxford: Blackwell, 107–127.

Geeraerts, D. (2006). *Cognitive Linguistics*: *Basic Readings*. Berlin, New York: Mouton De Gruyter.

Geeraerts, D./Grondelaers, S. (1995). Loooking back at anger: Cultural tra-ditions and metaphorical patterns. In: Taylor, J./MacLaury, R. E. (Eds.), *Language and the Cognitive Construal of the World*. Berlin, New York: De Gruyter Mouton, 153–180.

Gentner, D. (2003). Why we're so smart. In: Gentner, D./Goldin-Meadow, S. (Eds.), *Language in Mind: Advances in the Study of Language and Thought*. Cambridge, MA: MIT Press, 195–235.

Gentner, D./Goldin-Meadow, S. (2003). Whither Whorf. In: Gentner, D./Goldin-Meadow, S. (Eds.), *Language in Mind: Advances in the Study of Language and Thought.* Cambridge, MA: MIT Press, 3–14.

Gerofsky, S. (2011). *Seeing* the graph vs. *being* the graph: Gesture, engagement and awareness in school mathematics. In: Stam, G./Ishino, M. (Eds.), *Integrating gestures: The interdisciplinary nature of gesture*. Amsterdam, Philadelphia: John Benjamins, 245–256.

Gibbs, R. W. (1994). *The Poetics of Mind: Figurative Thought, Language, and Understanding*. Cambridge. Cambridge University Press.

Gibbs, R. W. (2005). Embodiment in metaphorical imagination. In: Pecher, D./Zwaan, R. A. (Eds.), *Grounding Cognition: The Role of Perception and Action in Memory, Language, and Thinking*. Cambridge, New York: Cambridge University Press, 65–92.

Gibbs, R. W. (2008). Metaphor and thought: The state of the art. In: Gibbs, R. W. (Ed.), *The Cambridge Handbook of Metaphor and Thought*. Cambridge: Cambridge University Press, 3–13.

Glück, H./Rödel, M. (Eds.) (2016). *Metzler Lexikon Sprache* (5. aktual. und überarb. Aufl.). Stuttgart, Weimar: J. B. Metzler.

Glücksarchiv (2017). *gluecksarchiv.de. Alles zum Thema „Glücklich sein"* [http://www.gluecksarchiv.de/index.html, 5. July 2017].

Goldberg, A. E. (1995). *Constructions: A Construction Grammar Approach to Argument Structure*. Chicago, London: University of Chicago Press.

Goldberg, A. E. (2006). *Constructions at Work: The Nature of Generalization in Language*. Oxford, New York: Oxford Un iversity Press.

Goldberg, A. E. (2009). The nature of generalization in language. *Cognitive Linguistics* 20: 1, 93–127.

Goldberg, A. E. (2013). Constructionist approaches. In: Hoffmann, T./Trousdale, G. (Eds.), *The Oxford Handbook of Construction Grammar*. Oxford, New York: Oxford University Press, 15–31.

Goldberg, A. E. (2019). *Explain me this. Creativity, competition, and the partial productivity of constructions*. Princeton: Princeton University Press.

Goldin-Meadow, S. (2003). *Hearing Gesture: How our Hands Help us Think.* Cambridge, MA: The Belknap Press.

Goldin-Meadow, S. (2006). Talking and thinking with our hands. *Psychological Sciences* 15: 1, 34–39.

Goldin-Meadow, S. (2007). The two faces of gesture: Language and thought. In: Liebal, K./Müller, C./Pika, S. (Eds.), *Gestural Communication in Nonhuman and Human Primates*. Amsterdam, Philadelphia: John Benjamins, 219–233.

Goldin-Meadow S./Nusbaum H./Kelly S. D./Wagner S. (2001). Explaining math: Gesturing lightens the load. *Psychological Science* 12: 6, 516–522.

Götz, D. (2003). *Langenscheidt-Großwörterbuch Deutsch als Fremdsprache*. Berlin u. a.: Langenscheidt.

Grady, J. (1997). *Foundations of Meaning: Primary Metaphors and Primary Scenes*. Unpublished Dissertation. Berkeley, CA, University of California.

Grady, J./Johnson, C. (2003). Converging evidence for the notions of subscene and primary scene. In: Dirven, R./Porings, R. (Eds.), *Metaphor and Metonymy in Comparison and Contrast*. Berlin, New York: Mouton De Gruyter, 533–554.

Graziano, M./Gullberg, M. (2013). Gesture production and speech fluency in competent speakers and language learners. *Proceedings of the Tilburg Gesture Research Meeting (TiGeR) 2013*. Tilburg, Netherlands [https://tiger.uvt.ul/pdf/papers/graziano.pdf, July 2013].

Greenberg, J. H. (1963). *Universals of Language*. Cambridge, MA: MIT Press.

Grimm, J./Grimm, W. (1854‑1961). *Deutsches Wörterbuch (DWB)* (16 Bände in 32 Teilbänden) [http://woerterbuchnetz.de/cgi-bin/WBNetz/wbgui_py?sigle=DWB, 14. January 2017].

Grimmstories (2023). *Fundevogel*. https://www.grimmstories.com/language.php?grimm=051&l=en&r=de [26. July 2023].

Grosjean, F. (2010). *Bilingual: Life and Reality*. Cambridge, MA: Harvard University Press.

Gullberg, M. (1998). *Gesture as a Communication Strategy in Second Language Discourse. A Study of Learners of French and Swedish*. Lund: Lund University Press.

Gullberg, M. (2006). Some reasons for studying gesture and second language acquisition (Hommage à Adam Kendon). *International Review of Applied Linguistics* 44: 2, 103–124.

Gullberg, M. (2014). Gestures and second language acquisition. In: Müller, C./Cienki, A./Fricke, E./Ladewig, S./McNeill, D./Bressem, J. (Eds.), *Body – Language – Communication: An International Handbook on Multimodality in Human Interaction*, Vol. 2. Berlin, Boston: De Gruyter Mouton, 1868–1886.

Gullberg, M./de Bot, K./Volterra, V. (2008). Gestures and some key issues in the study of language development. *Gesture* 8: 2, 149–179.

Hadar, U./Dar, R./Teitelman, A. (2001). Gesture during speech in first and second language: Implications for lexical retrieval. *Gesture* 1: 2, 151–165.

Hancin-Bhatt, B. (2008). Second language phonology in optimality theory. In: Hansen Edwards, J. G./Zampini, M. L. (Eds.), *Phonology and Second Language Acquisition*. Amsterdam, Philadelphia: John Benjamins, 117–146.

Hanke, U. (2006). *Externale Modellbildung als Hilfe bei der Informationsverarbeitung und beim Lernen*. Dissertation. Freiburg, Albert-Ludwigs-Universität.

Harris, R. (1987). *Reading Saussure: A Critical Commentary on the Cours de Linguistique Générale*. London: Duckworth.

Harrison, S./Ladewig, S. H. (2021). Recurrent gestures throughout bodies, languages, and cultural practices. *Gesture* 20: 2, 153–179.

Haspelmath, M. (1997). *From Space to Time: Temporal Adverbials in the World's Languages*. München, Newcastle: Lincom Europa.

Haspelmath, M. (2003). The geometry of grammatical meaning: Semantic maps and cross-linguistic comparison. In: Tomasello, M. (Ed.), *The New Psychology of Language: Cognitive and Functional Approaches to Language Structure*, Vol. 2. Mahwah, NJ: Lawrence Erlbaum, 211–242.

Hauser, M. D./Chomsky, N./Fitch, W. T. (2002). The faculty of language: What is it, who has it, and how did it evolve? *Science* 298, 1569–1579.

Heine, B. (1997). Cognitive Foundations of Grammar. New York, Oxford: Oxford University Press.

Heine, B./Kuteva, T. (2002). *World Lexicon of Grammaticalization*. Cambridge: Cambridge University Press.

Helbig, G. (2001). Linguistische und didaktische Grammatik. In: Helbig, G./Götze, L./Henrici, G./Krumm, H.-J. (Eds.), *Deutsch als Fremdsprache. Ein internationales Handbuch*, 2. Halbbd. Berlin, New York: De Gruyter, 187–194.

Hennon, E./Hirsh-Pasek, K./Golinkoff, R. M. (2000). Die besondere Reise vom Fötus zum spracherwerbenden Kind. In: Grimm, H. (Ed.), *Sprachentwicklung*. Göttingen u.a.: Hogrefe, 41–103.

Hepp, M. (2012). *Wortbildung als Mittel der Textkonstitution*. Pisa: Arnus.

Hewson, P. W./Hewson, M. A. (1984). The role of conceptual conflict in conceptual change and the design of science instruction. *Instructional Science* 13: 1, 1–13.

Hilpert, M. (2014). *Construction Grammar and its Application to English*. Edinburgh: Edinburgh University Press.

Hirsh-Pasek, K./Golinkoff, R. M. (1996). *The Origins of Grammar: Evidence from Early Language Comprehension*. Cambridge, MA: The MIT Press.

Hockett, C. F. (1960). The origin of speech. *Scientific American* 203: 3, 88–97.

Höder, S. (2012). Multilingual constructions: A diasystematic approach to common structures. In: Braunmüller, K./Gabriel, C. (Eds.), *Multilingual Individuals and Multilingual Societies*. Amsterdam, Philadelphia: John Benjamins, 241–257.

Höder, S. (2014). Constructing diasystems: Grammatical organisation in bilingual groups. In: Åfarli, T. A./Mæhlum, B. (Eds.), *The Sociolinguistics of Grammar*. Amsterdam, Philadelphia: John Benjamins, 137–152.

Hoffmann, T. (2022). *Construction grammar: The Structure of English*. Cambridge: Cambridge University Press.

Hoffmann, T./Trousdale, G. (Eds.) (2013). *The Oxford Handbook of Construction Grammar*. Oxford, New York: Oxford University Press.

Höhle, B. (2005). Der Einstieg in die Grammatik: Spracherwerb während des ersten Lebensjahres. *Forum Logopädie* 6, 16–21.

Holme, R. (2009). *Cognitive Linguistics and Language Teaching*. Basingstoke, New York: Palgrave Macmillan.

Hotze, L. (2019). Gesten im Fremdsprachenunterricht: Verstehen, Memorieren, Problemlösen. In: Jessen, M./Blomberg J./Roche, J. (Eds.), *Kognitive Linguistik*. Tübingen: Narr, 308–316.

Hunfeld, H. (1997). Zur Normalität des Fremden. Voraussetzungen eines Lehrplanes für Interkulturelles Lernen. In: BMW AG (Ed.), *LIFE (Grundwerk). Ideen und Materialien für interkulturelles Lernen*. München: BMW AG.

Hupp, J. M./Gingras, M. C. (2016). The role of gesture meaningfulness in word learning. *Gesture* 15: 3, 340–356.

Hutchinson, S./Louwerse, M. M. (2013). Language statistics and individual differences in processing primary metaphors. *Cognitive Linguistics* 24: 4, 667–687.

Ibbotson, P./Tomasello, M. (2009). Prototype constructions in early language acquisition. *Language and Cognition* 1: 1, 59–85.

Ifenthaler, D. (2006). *Diagnose lernabhängiger Veränderung mentaler Modelle. Entwicklung der SMD-Technologie als methodologisches Verfahren zur relationalen, strukturellen und semantischen Analyse individueller Modellkonstruktionen*. Dissertation. Freiburg, Albert-Ludwigs-Universität.

Ifenthaler, D. (2008). Practical solutions for the diagnosis of progressing mental models. In: Ifenthaler, D./Pirnay-Dummer, P./Spector, J. M. (Eds.), *Understanding Models for Learning and Instruction. Essays in Honor of Norbert M. Seel*. New York, London: Springer, 43–61.

Ifenthaler, D. (2010). Relational, structural, and semantic analysis of graphical representations and concept maps. *Educational Technology Research and Development* 58, 81–97.

Ifenthaler, D./Masduki, I./Seel, N. M. (2011). The mystery of cognitive structure and how we can detect it: Tracking the development of cognitive structures over time. *Instructional Science* 39, 41–61.

Ifenthaler, D./Seel, N. M. (2011). A longitudinal perspective on inductive reasoning tasks. Illuminating the probability of change. *Learning and Instruction* 21: 4, 538–549.

Ifenthaler, D./Seel, N. M. (2013). Model-based reasoning. *Computers & Education* 64, 131–142.

Ishino, M. (2001). Conceptual metaphors and metonymies of metaphoric gestures of anger in discourse of native speakers of Japanese. *CLS* 37, 259–273.

Jacobsen, N. (2018). The best of both worlds: Combining cognitive linguistics and pedagogic tasks to teach English conditionals. *Applied Linguistics* 39: 5, 668–693.

Janda, L. (2007). Inflectional Morphology. In: Geeraerts, D./Cuyckens, H. (Eds.), *Handbook of Cognitive Linguistics*. Oxford: Oxford University Press, 632–649.

Jarvis, S./Pavlenko, A. (2008). *Crosslinguistic Influence in Language and Cognition*. New York: Routledge.

Jessen, M./Blomberg, J./Roche, J. (Eds.) (2018). *Kognitive Linguistik*. Tübingen: Narr Francke Attempto.

Johnson, M. (1987). *The Body in the Mind: The Bodily Basis of Meaning, Imagination, and Reason*. Chicago, London: The University of Chicago Press.

Johnson, M. (2005). The philosophical significance of image schemas. In: Hampe, B./Grady, J. E. (Eds.), *From Perception to Meaning. Image Schemas in Cognitive Linguistics*. Berlin, New York: Mouton De Gruyter, 15–34.

Johnson-Laird, P. N. (1983). *Mental Models: Towards a Cognitive Science of Language, Inference, and Consciousness*. Cambridge, MA: Cambridge University Press.

Johnson-Laird, P. N. (1989). Mental models. In: Posner, M. (Ed.), *Foundations of Cognitive Science*. Cambridge, MA: MIT Press, 469–499.

Johnson-Laird, P. N. (2004). The history of mental models. In: Manktelow, K./Chung, M. C. (Eds.), *Psychology of Reasoning: Theoretical and Historical Perspectives*. Hove, New York: Psychology Press, 179–212.

Johnson-Laird, P. N. (2013). Mental models and cognitive change. *Journal of Cognitive Psychology* 25: 2, 131–138.

Jonassen, D./Cho, Y. H. (2008). Externalizing mental models with mindtools. In: Ifenthaler, D./Pirnay-Dummer, P./Spector, J. M./Seel, N. M. (Eds.), *Understanding Models for Learning and Instruction*, 145–159.

Jonassen, D./Strobel, J./Gottdenker, J. (2005). Model building for conceptual change. *Interactive Learning Environments* 13: 1–2, 15–37.

Jungen, O./Lohnstein, H. (2006). Einführung in die Grammatiktheorie. München: Fink.

Jusczyk, P. W./Hirsh-Pasek, K./Kemler Nelson, D. G./Kennedy, L. J./Woodward, A./Piwoz, J. (1992). Perception of acoustic correlates of major phrasal units by young infants. *Cognitive Psychology* 24, 252–293.

Kanaplianik (EL-Bouz), K. (2016). *Kognitionslinguistisch basierte Animationen für die deutschen Modalverben. Zusammenspiel der kognitiven Linguistik und des multimedialen Lernens bei der Sprachvermittlung*. Berlin, Münster: Lit.

Kauschke, C. (2012). *Kindlicher Spracherwerb im Deutschen: Verläufe, Forschungsmethoden, Erklärungsansätze*. Berlin, Boston: De Gruyter.

Kay, P./Fillmore, C. J. (1999). Grammatical constructions and linguistic generalizations: The what's X doing Y? construction. *Language* 75: 1, 1–33.

Kellerman, Susan (1992), "I see what you mean": The role of kinesic behaviour in listening and implications for foreign and second language learning. *Applied Linguistics* 1: 3, 239–258.

Kendon, A. (1972). Some relationships between body motion and speech. An analysis of an example. In: Siegman, A. W./Pope, B. (Eds.), *Studies in Dyadic Communication*. New York: Elsevier, 177–210.

Kendon, A. (1980). Gesticulation and speech: Two aspects of the process of utterance. In: Key, M. R. (Ed.), *The Relationship of Verbal and Nonverbal Communication*. The Hague, Paris, New York: Mouton, 207–228.

Kendon, A. (2004). *Gesture: Visible Action as Utterance*. Cambridge: Cambridge University Press.

Klann-Delius, G. (2008). *Spracherwerb. Eine Einführung* (2. Aufl.). Stuttgart: J. B. Metzler.

Kleiber, G. (1993). *Prototypensemantik. Eine Einführung*. Tübingen: Narr.

Koch, N. (2019). *Schemata im Erstspracherwerb. Eine Traceback-Studie für das Deutsche*. Berlin, Boston: De Gruyter.

Kohl-Dietrich, D./Juchem-Grundmann, C./Schnotz, W. (2016). Conceptual motivation as a tool for raising language awareness in the English as a foreign language classroom – Does it enhance learning outcomes? Insights from an empirical study. *Yearbook of the German Cognitive Linguistics Association* 4: 1, 193–210.

Köppe, R. (1997). Language differentiation in bilingual children: The development of grammatical and pragmatic competence. *Linguistics* 34: 5, 927–954.

Köppe, R./Meisel, J. (1995). Code-switching in bilingual first language acquisition. In: Milroy, L./Muysken, P. (Eds.), *One Speaker, Two Languages: Multidisciplinary Perspectives on Code-Switching*. Cambridge, New York, Melbourne: Cambridge University Press, 276–301.

Kortmann, B. (1999). *Linguistik: Essentials. Anglistik, Amerikanistik*. Berlin: Cornelsen.

Kövecses, Z. (2000a). The scope of metaphor. In: Barcelona, A. (Ed.), *Metaphor and Metonymy at the Crossroads: A Cognitive Perspective*. Berlin, New York: Mouton De Gruyter, 79–92.

Kövecses, Z. (2000b). *Metaphor and Emotion. Language, Culture, and Body in Human Feeling*. Cambridge: Cambridge University Press.

Kövecses, Z. (2002). *Metaphor: A Practical Introduction*. Oxford, New York: Oxford University Press.

Krauss, R. M./Hadar, U. (1999). The role of speech-related arm/hand gestures in word retrieval. In: Messing, L. S./Campbell, R. (Eds.), *Gesture, speech, and sign*. Oxford, New York: Oxford University Press, 93–116.

Krusche, D./Krechel, R. (1984). *Anspiel. Konkrete Poesie im Unterricht Deutsch als Fremdsprache*. Bonn: Inter Nationes.

Kupisch, T. (2006). *The Acquisition of Determiners in Bilingual German-Italian and German-French Children.* München: Lincom Europa.

Ladewig, S. H. (2010). Beschreiben, suchen und auffordern. Varianten einer rekurrenten Geste. *Sprache und Literatur* 41: 1, 89–111.

Ladewig, S. H. (2014a). Creating multimodal utterances: The linear integration of gestures into speech. In: Müller, C./Cienki, A./Fricke, E./Ladewig, S./McNeill, D./Tessendorf, S. (Eds.), *Body – Language – Communication: An International Handbook on Multimodality in Human Interaction*, Vol. 2. Berlin, Boston: De Gruyter Mouton, 1662–1677.

Ladewig, S. H. (2014b). Recurrent gestures. In: Müller, C./Cienki, A./Fricke, E./Ladewig, S./McNeill, D./Tessendorf, S. (Eds.), *Body – Language – Communication: An International Handbook on Multimodality in Human Interaction*, Vol. 2. Berlin, Boston: De Gruyter Mouton, 1558–1575.

Ladewig, S. H. (2014c). The cyclic gesture. In: Müller, C./Cienki, A./Fricke, E./Ladewig, S. H./McNeill, D./Bressem, J. (Eds.), *Body – Language – Communication: An International Handbook on Multimodality in Human Interaction*, Vol. 2. Berlin, Boston: De Gruyter Mouton, 1605–1618.

Ladewig, S. H. (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. H. (2019b). Gesten und ihre Bedeutung. In: Jessen, M./Blomberg J./Roche, J. (Eds.), *Kognitive Linguistik.* Tübingen: Narr, 295–307.

Ladewig, S. H. (2020). *Integrating Gestures. The Dimension of Multimodality in Cognitive Grammar*. Berlin, Boston: De Gruyter Mouton.

Ladewig, S. H./Bressem, J. (2013). New insights into the medium hand: Discovering recurrent structures in gestures. *Semiotica* 197, 203–231.

Lai, C. S. L./Fisher, S. E./Hurst, J. A./Vargha-Khadem, F./Monaco, A. P. A. (2001). A forkhead-domain gene is mutated in a severe speech and language disorder. *Nature* 413, 519–523.

Lakoff, G. (1973). Hedges: A study in meaning criteria and the logic of fuzzy concepts. *Journal of Philosophical Logic* 2, 458–508.

Lakoff, G. (1987). *Women, Fire, and Dangerous Things: What Categories Reveal about the Mind*. Chicago, London: University of Chicago Press.

Lakoff, G. (1993). The contemporary theory of metaphor. In: Ortony, A. (Ed.), *Metaphor and Thought* (2nd ed.). Cambridge: Cambridge University Press.

Lakoff, G. (2006). Conceptual metaphor: The contemporary theory of metaphor. In: Geeraerts, D. (Ed.), *Cognitive Linguistics: Basic Readings*. Berlin, New York: De Gruyter Mouton, 183–238.

Lakoff, G./Johnson, M. (1980). *Metaphors We Live by*. Chicago, London: 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./Johnson, M. (2003). *Metaphors We Live By*. Chicago, London: University of Chicago Press (Original work published 1980).

Lakoff, G./Johnson, M. (2011). *Leben in Metaphern. Konstruktion und Gebrauch von Sprachbildern.* Aus dem Amerikanischen übersetzt von A. Hildenbrand (7. Aufl.). Heidelberg: Carl-Auer.

Lakoff, G./Turner, M. (1989). *More Than Cool Reason: A Field Guide to Poetic Metaphor*. Chicago, London: University of Chicago Press.

Lampert, G./Lampert, M. (2000). *The Conceptual Structure(s) of Modality: Essences and Ideologies. A Study in Linguistic (Meta-) Categorization*. Frankfurt/Main, New York: Peter Lang.

Langacker, R. W. (1982). Space grammar, analysability, and the English passive. *Language* 58: 1, 22–80.

Langacker, R. W. (1986). An introduction to cognitive grammar. *Cognitive Science* 10: 1, 1–40.

Langacker, R. W. (1987). *Foundations of Cognitive Grammar: Theoretical Prerequisites,* Vol. 1. Stanford, CA: Stanford University Press.

Langacker, R. W. (1991). *Concept, Image, and Symbol: The Cognitive Basis of Grammar.* Berlin, New York: Mouton De Gruyter.

Langacker, R. W. (1995). Viewing in cognition and grammar. In: Davis, P. W. (Ed.), *Alternative Linguistics: Descriptive and Theoretical Modes*. Amsterdam, Philadelphia: John Benjamins, 153–221.

Langacker, R. W. (2000). A dynamic usage-based model. In: Barlow, M./Kemmer, S. (Eds.), *Usage-Based Models of Language*. Stanford, CA: CSLI, 24–63.

Langacker, R. W. (2001). Dynamicity in grammar. *Axiomathes* 12, 7–33.

Langacker, R. W. (2005). Construction grammars: cognitive, radical, and less so. In: Ruiz de Mendoza Ibáñez, F. J./Peña Cervel, S. M. (Eds.), *Cognitive Linguistics: Internal Dynamics and Interdisciplinary Interaction*. Berlin, New York: Mouton De Gruyter, 101–159.

Langacker, R. W. (2008a). *Cognitive Grammar. A Basic Introduction*. Oxford, New York: Oxford University Press.

Langacker, R. W. (2008b). 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). Cognitive (construction) grammar. *Cognitive Linguistics* 20: 1, 167–176.

Lanza, E. (1997). *Language Mixing in Infant Bilingualism: A Sociolinguistic Perspective*. Oxford: Clarendon Press.

Levinson, S. C. (2000). Yélî Dnye and the theory of basic color terms. *Journal of Linguistic Antropology* 10: 1, 3–55.

Levinson, S. C. (2003). *Space in Language and Cognition: Explorations in Cognitive Diversity*. Cambridge: Cambridge University Press.

Levinson, S. C./Wilkins, D. P. (Eds.) (2006). *Grammars of Space: Explorations in Cognitive Diversity*. Cambridge: Cambridge University Press.

Lieven, E./Behrens, H./Speares, J./Tomasello, M. (2003). Early syntactic creativity: A usage-based approach. *Journal of Child Language* 30: 2, 333–370.

Lieven, E./Tomasello, M. (2008). Children's first language acquistion from a usage-based perspective. In: Robinson, P./Ellis, N. C. (Eds.), *Handbook of Cognitive Linguistics and Second Language Acquisition*. New York, London: Routledge, 168–196.

Lipka, L. (2002). *English Lexicology: Lexical Structure, Word Semantics & Word-Formation*. Tübingen: Narr.

Littlemore, J. (2009). *Applying Cognitive Linguistics to Second Language Learning and Teaching*. Basingstoke, New York: Palgrave Macmillan.

Littlemore, J./Low, G. (2006). *Figurative Thinking and Foreign Language Learning*. Basingstoke, New York: Palgrave Macmillan.

Lleó, C./El Mogharbel, C./Prinz, M. (1994). Babbling und Frühwort-Produktion im Deutschen und Spanischen, *Linguistische Berichte* 151, 191–217.

Loehr, D. P. (2004). *Gesture and Intonation*. Washington, DC: Georgetown University Press.

Lowe, R. (2003). Animation and learning: Selective processing of information in dynamic graphics. *Learning and Instruction* 13, 157–176.

Lupyan, G. (2012). Linguistically modulated perception and cognition: The label-feedback hypothesis. *Frontiers in Psychology* 3, 54.

Lyons, J. (1970). Introduction. In: Lyons, J. (Ed.), *New Horizons in Linguistics*. Harmondsworth: Penguin, 7–28.

MacWhinney, B. (2004). A multiple process solution to the logical problem of language acquisition. *Journal of Child Language* 31, 883–914.

Madlener, K./Behrens, H. (2015). *Konstruktion(en) sprachlichen Wissens. Lernprozesse im Erst- und Zweitspracherwerb*. Arbeitspapier. Basel, Universität Basel [https://www.rug.nl/let/organization/bestuur-afdelingen-en-medewerkers/afdelingen/afdeling-europese-talenen-culturen/nieuws_media_activiteiten/agenda-items/behrens.pdf, 2. January 2018].

Majid, A. (2006). Body part categorization in Punjabi. *Language Sciences* 28, 241–261.

Majid, A./Bowerman, M./Kita, S./Haun, D. B. M./Levinson, S. C. (2004). Can language restructure cognition? The case for space. *Trends in Cognitive Sciences*, 8: 3, 108–114.

Malotki, E. (1983). *Hopi Time: A Linguistic Analysis of the Temporal Concepts in the Hopi Language*. Berlin, New York, Amsterdam: Mouton.

Mampe, B./Friederici, A. D./Christophe, A./Wermke, K. (2009). Newborns' cry melody is shaped by their native language. *Current Biology* 19: 23, 1994–1997.

Marchman, V./Bates, E. (1994). Continuity in lexical and morphological development: A test of the critical mass hypothesis. *Journal of Child Language* 21, 339–366.

Masna, Y. (2020). EFL learners' code-switching: Why do they switch the language? *Englisia: Journal of Language, Education, and Humanities* 8: 1, 93–101.

McClave, E. Z. (1991). *Intonation and Gesture*. Unpublished PhD Thesis. Washington, DC, Georgetown University.

McNeill, D. (1985). So you think gestures are nonverbal? *Psychological Review* 92: 3, 350–371.

McNeill, D. (1992). *Hand and Mind: What Gestures Reveal about Thought*. Chicago, London: University of Chicago Press.

McNeill, D. (2005). *Gesture and Thought*. Chicago, London: University of Chicago Press.

McNeill, D. (2007). Gesture and thought. In: Esposito, A./Bratanić, M./Keller, E./Marinaro, M. (Eds.), *Fundamentals of Verbal and Nonverbal Communication and the Biometric Issue*. Amsterdam: IOS Press, 20–33.

McNeill, D./Duncan, S. D. (2000). Growth points in thinking-for-speaking. In: McNeill, D. (Ed.), *Language and Gesture*. Cambridge: Cambridge University Press, 141–161.

McNeill, D./Levy, E. T. (1982). Conceptual representations in language activity and gesture. In Jarvella, R./Klein, W. (Eds.), *Speech, place, and action*: *Studies in deixis and related topics*. Chichester u.a.: Wiley, 271–295.

Meex, B./Mortelmans, T. (2002). Grammatik und Kognition. Deutsch anders gedacht. *Germanistische Mitteilungen* 56, 48–65.

Meisel, J. M. (2001). The simultaneous acquisition of two first languages: Early differentiation and subsequent development of grammars. In: Cenoz, J./Genesee, F. (Eds.), *Trends in Bilingual Acquisition*. Amsterdam, Philadelphia: John Benjamins, 11–41.

Meisel, J. M. (2004). The bilingual child. In: Bhatia, T. K./Ritchie, W. C. (Eds.), *The Handbook of Bilingualism*. Oxford: Blackwell, 91–113.

Meisel, J. M. (2010). Age of onset in successive acquisition of bilingualism. In: Kail, M./Hickmann, M. (Eds.), *Language Acquisition across Linguistic and Cognitive Systems*. Amsterdam, Philadelphia: John Benjamins, 225–247.

Meisel, J. M. (2013). *Sensitive phases in successive language acquisition: The critical period hypothesis revisited.* In: Boeckx, C./Grohmann, K. (Eds.), *The Cambridge Handbook of Biolinguistics*. Cambridge, New York: Cambridge University Press, 69–85.

Miller, G. A./Johnson-Laird, P. N. (1976). *Language and Perception*. Cambridge, MA: Harvard University Press.

Mistree, F./Ifenthaler, D./Siddique, Z. (2013). Empowering engineering students to learn how to learn. *Proceedings of the 120th ASEE Annual Conference and Exhibition.* Atlanta, GA [http://www.asee.org/public/conferences/20/papers/7234/download, 8. May 2013].

Mittelberg, I. (2006). *Metaphor and Metonymy in Language and Gesture: Discourse Evidence for Multimodal Models of Grammar*. Ann Arbor, MI: Cornell University Press.

Mittelberg, I. (2010). Interne und externe Metonymie: Jakobsonsche Kontiguitätsbeziehungen in redebegleitenden Gesten. *Sprache und Literatur* 41: 105, 112–143.

Mittelberg, I./Waugh, L. R. (2009). Metonymy first, metaphor second: A cognitive-semiotic approach to multimodal figures of thought in co-speech gesture. In: Forceville, C./Urios-Aparisi, E. (Eds.), *Multimodal Metaphor*. Berlin, New York: Mouton De Gruyter, 329–356.

Mondada, L. (2014). Pointing, talk, and the bodies: Reference and joint attention as embodied interactional achievements. In: Seyfeddinipur, M./Gullberg, M. (Eds.), *From Gesture in Conversation to Visible Action as Utterance: Essays in Honor of Adam Kendon*. Amsterdam, Philadelphia: John Benjamins, 95–124.

Moon, C./Cooper, R. P./Fifer, W. P. (1993). Two-day-olds prefer their native language. *Infant Behavior & Development* 16: 4, 495–500.

Moreno, R./Mayer, R. E. (2002). Animation as an aid to multimedia learning. *Educational Psychology Review* 14: 1, 87–99.

Morett, L./Gibbs, R. W./MacWhinney, B. (2012). The role of gestures in second language learning: Communication, acquisition, & retention. In: Miyake, N./Peebles, D./Cooper, R. P. (Eds.), *34th Annual Conference of the Cognitive Science Society*. Austin, TX: Cognitive Science Society, 773–778.

Moser, K. (2003). Mentale Modelle und ihre Bedeutung. Kognitionspsychologische Grundlagen des Missverstehens. In: Ganz-Blättler, U./Michel, P. (Eds.), *Sinnbildlich schief. Missgeschicke bei Symbolgenese und Symbolgebrauch*. Bern, New York: Peter Lang, 181–205.

Mosher, J. A. (1916). *The Essentials of Effective Gesture for Students of Public Speaking*. New York: The Macmillan company.

Müller, C. (1998). *Redebegleitende Gesten: Kulturgeschichte – Theorie – Sprachvergleich*. Berlin: Arno Spitz.

Müller, C. (2004). Forms and uses of the palm up open hand: A case of a gesture family? In: Müller, C./Posner, R. (Eds.), *The Semantics and Pragmatics of Everyday Gestures*. Berlin: Weidler, 234–256.

Müller, C. (2008a). What gestures reveal about the nature of metaphor. In: Cienki, A./Müller, C. (Eds.), *Metaphor and Gesture*. Amsterdam: Benjamins, 249–275.

Müller, C. (2008b). *Metaphors Dead and Alive, Sleeping and Waking: A Dynamic view*. Chicago: Chicago University Press.

Müller, C. (2010a). Mimesis und Gestik. In: Koch, G./Vöhler, M./Voss, C. (Eds.), *Die Mimesis und ihre Künste*. Paderborn, München: Fink, 149–187.

Müller, C. (2010b). Wie Gesten bedeuten. Eine kognitiv-linguistische und sequenzanalytische Perspektive. *Sprache und Literatur* 41: 1, 37–68.

Müller, C. (2013). Gestures as a medium of expression: The linguistic potential of gestures. In: Müller, C./Cienki, A./Fricke, E./Ladewig, S. H./McNeill, D./Tesendorf, S. (Eds.), *Body – Language – Communication: An International Handbook on Multimodality in Human Interaction*, Vol. 1. Berlin, Boston: De Gruyter Mouton, 202–217.

Müller, C. (2014a). Gesture as "deliberate expressive movement". In: Seyfeddinipur, M./Gullberg, M. (Eds.), *From Gesture in Conversation to Visible Action as Utterance: Essays in Honor of Adam Kendon*. Amsterdam, Philadelphia: John Benjamins, 127–152.

Müller, C. (2014b). Gestural modes of representation as techniques of depiction. In: Müller, C./Cienki, A./Fricke, E./Ladewig, S. H./McNeill, D./Bressem, J. (Eds.), *Body – Language – Communication: An International Handbook on Multimodality in Human Interaction*, Vol. 2. Berlin, Boston: De Gruyter Mouton, 1687–1702.

Müller, C. (2017). How recurrent gestures mean: Conventionalized contexts-of-use and embodied motivation. *Gesture* 16: 2, 278–306.

Müller, C. (2018). Gesture and Sign: Cataclysmic Break or Dynamic Relations? *Frontiers in Psychology* 9, 1651.

Müller, C./Bressem, J./Ladewig, S. H., (2013). Towards a grammar of gestures: A form-based view. In: Müller, C./Cienki, A./Fricke, E./Ladewig, S. H./McNeill, D./Teßendorf, S. (Eds.), *Body – Language – Communication. An International Handbook on Multimodality in Human Interaction*, Vol. 1. Berlin, Boston: De Gruyter Mouton, 707–733.

Müller, C./Cienki, A. (2009). Words, gestures, and beyond: Forms of multimodal metaphor in the use of spoken language. In: Forceville, C./Urios-Aparisi, E. (Eds.), *Multimodal Metaphor*. Berlin, New York: Mouton De Gruyter, 297–328.

Müller, C./Kappelhoff, H. (Eds.) (2018). *Cinematic Metaphor: Experience – Affectivity – Temporality*. Berlin, Boston: De Gruyter.

Müller, C./Ladewig, S. H. (2013). Metaphors for sensorimotor experiences: Gestures as embodied and dynamic conceptualizations of balance in dance lessons. In: Dancygier, B./Hinnell, J./Borkrent, M. (Eds.), *Language and the Creative Mind*, Stanford: CSLI, 295–324.

Müller, C./Ladewig, S. H./Bressem, J. (2013). Gestures and speech from a linguistic perspective: A new field and its history. In: Müller, C./Cienki, A./Fricke, E./Ladewig, S./McNeill, D./Tessendorf, S. (Eds.), Vol. 1. Berlin, Boston: De Gruyter Mouton, 55–81.

Müller-Jacquier, B.-D. (1981). *Konfrontative Semantik*. Weil der Stadt: Narr.

Narayanan, S. (1997). *KARMA: Knowledge-based Action Representations for Metaphor and Aspect*. Berkeley, Los Angeles: University of California Press.

Nathan, M. J./Alibali, M. W. (2011). How gestures use enables intersubjectivity in the classroom. In: Stam, G./Ishino, M. (Eds.), *Integrating Gestures*. Amsterdam, Philadelphia: John Benjamins, 257–265.

Nuñez, R. E./Sweetser, E. (2006). With the future behind them: Convergent evidence from Aymara language and gesture in the crosslinguistic comparison of spatial construals of time. *Cognitive Science* 30: 3, 401–450.

Oller, D. K./Eilers, R. E./Urbano, R./Cobo-Lewis, A. B. (1997). Development of precursors to speech in infants exposed to two languages. *Journal of Child Language* 24: 2, 407–425.

Olson, E. T. (2002). What writing does to the mind. In: Amsel, E./Byrnes, J. P. (Eds.), *Language, Literacy, and Cognitive Development: The Development and Consequences of Symbolic Communication*. Mahwah, NJ: Lawrence Erlbaum, 153–166.

O'Regan, J. K./Noë, A. (2001). A sensorimotor account of vision and visual consciousness. *Behavioral and Brain Sciences* 24: 5, 939–1031.

Ortíz, M. (2011). Primary metaphors and monomodal visual metaphors. *Journal of Pragmatics* 43: 6, 1568–1580.

Ott, E. A. (1902). *How to Gesture*. New York: Hinds & Noble.

Palmer, G. B. (2007). Cognitive linguistics and anthropological linguistics. In: Geeraerts, D./Cuyckens, H. (Eds.), *The Oxford Handbook of Cognitive Linguistics*. Oxford, New York: Oxford University Press, 1045–1073.

Panther, K.-U. (2005). The role of conceptual metonymy in meaning construction. In: Ruiz de Mendoza Ibáñez, F. J./Peña Cervel, S. M. (Eds.), *Cognitive Linguistics: Internal Dynamics and Interdisciplinary Interaction*. Berlin, New York: Mouton De Gruyter, 353–386.

Paradis, J./Nicoladis, E./Crago, M./Genesee, F. (2011). Bilingual children's acquisition of the past tense: A usage-based approach. *Journal of Child Language* 38: 3, 554–578.

Paradis, M. (2004). *A Neurolinguistic Theory of Bilingualism*. Amsterdam, Philadelphia: John Benjamins.

Pelyvás, P. (2000). Metaphorical extension of may and must into the epistemic domain. In: Barcelona, A. (Ed.), *Metaphor and Metonymy at the Crossroads: A Gognitive Perspective*. Berlin, New York: Mouton De Gruyter, 233–250.

Piaget, J. (1975). *Der Aufbau der Wirklichkeit beim Kinde. Gesammelte Werke*, Bd. 2. Stuttgart: Klett.

Pike, K. L. (Ed.) (1967). *Language in Relation to a Unified Theory of the Structure of Human Behavior*. The Hague, Paris: Mouton.

Pinker, S. (1994). *The Language Instinct. How the Mind Creates Language*. New York: Harper.

Pirnay-Dummer, P. (2006). *Expertise und Modellbildung: MITOCAR*. Dissertation. Freiburg, Albert-Ludwigs-Universität.

Pirnay-Dummer, P. (2011). *Comparison measures of T-MITOCAR, HI-MATT, and AKOVIA*. [http://www.pirnay-dummer.de/research/comparison_measures_2011-03-30.pdf, 2. February 2014].

Pirnay-Dummer, P./Ifenthaler, D. (2010). Automated knowledge visualization and assessment. In: Ifenthaler, D./Pirnay-Dummer, P./Seel, N. M. (Eds.), *Computer-Based Diagnostics and Systematic Analysis of Knowledge*. New York, London: Springer, 77–115.

Pirnay-Dummer, P./Ifenthaler, D. (2011). Text-guided automated self assessment: A graphbased approach to help learners with ongoing writing. In: Ifenthaler, D./Isaias, P./Spector, J. M./Kinshuk/Sampson, D. (Eds.), *Multiple Perspectives on Problem Solving and Learning in the Digital Age*. New York, London: Springer, 217–225.

Pirnay-Dummer, P./Ifenthaler, D./Spector, J. M. (2010). Highly integrated model assessment technology and tools. *Educational Technology Research and Development* 58: 1, 3–18.

Poplack, S. (1980). Sometimes I'll start a sentence in Spanish y termino en Español: Toward a typology of code-switching. *Linguistics* 18: 7, 581–618.

Pulvermüller, F. (2005). Brain mechanisms linking language and action. *Nature Reviews Neuroscience* 6: 7, 576–582.

Quintilian, M. F. (1969). *The Institutio Oratoria of Quintilian*. With an English translation by H. E. Butler. New York: G. P. Putnam.

Radden, G. (1994). Konzeptuelle Metaphern in der kognitiven Semantik. In: Börner, W./Vogel, K. (Eds.), *Kognitive Linguistik und Fremdsprachenerwerb. Das mentale Lexikon*. Tübingen: Narr, 69–87.

Ravid, D./Tolchinsky, L. (2002). Developing linguistic literacy: A comprehensive model. *Journal of Child Language* 29: 2, 417–447.

Reddy, M. J. (1979). The conduit metaphor: A case of frame conflict in our language about language. In: Ortony, A. (Ed.), *Metaphor and Thought*. Cambridge: Cambridge University Press, 284–310.

Reif, M. (2011). *Making Progress Simpler? Applying Cognitive Grammar to Tense-Aspect Teaching*. Frankfurt/Main: Peter Lang.

Rieber, L. P. (1991). Animation, incidental learning, and continuing motivation. *Journal of Educational Psychology* 83: 3, 318–328.

Riehl, C. M. (2014). *Mehrsprachigkeit. Eine Einführung*. Darmstadt: Wissenschaftliche Buchgesellschaft.

Rizzolatti, G./Craighero, L. (2004). The mirror-neuron system. *Annual review of neuroscience* 27: 1, 169–192.

Roberson, D./Davies, I./Davidoff, J. B. (2002), Color categories are not universal: Replications and new evidence. In: Saunders, B./van Brakel, J. (Eds.), *Theories, Technologies, Instrumentalities of Color: Anthropological and Historiographical Perspectives*. Langham: University Press of America, 25–35.

Roche, J. (2009). Fremdsprachenlernen online. In: Issing, L./Klimsa, P. (Eds.), *Online-Lernen. Handbuch für Wissenschaft und Praxis*. München: Oldenbourg, 389–400.

Roche, J. (2012). Zum überfälligen Paradigmenwechsel in der Fremdsprachendidaktik. In: Birk, A. (Ed.), *Linguistik und Sprachdidaktik im universitären DaF-Unterricht*. Münster: Waxmann, 33–52.

Roche, J. (2013). *Mehrsprachigkeitstheorie – Erwerb, Kognition, Transkulturation, Ökologie*. Tübingen: Gunter Narr Verlag.

Roche, J./Scheller, J. (2008). Grammar animations and cognition. In: Zhang, F./Barber, B. (Eds.), *Handbook of Research on Computer Enhanced Language Acquisition and Learning*. Hershey, PA: Information Science Reference, 205–218.

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. (Eds.) (2023). *Language Learning and Cognition. The Basics of Cognitive Language Pedagogy*. Berlin: Lit.

Rosch, E. (1973). Natural categories. *Cognitive Psychology* 4: 3, 328–350.

Rosch, E. (1975). Cognitive reference points. *Cognitive Psychology* 7: 4, 532–547.

Rosch, E. (1978). Principles of categorization. In: Rosch, E./Lloyd, B. B. (Eds.), *Cognition and Categorization*. Hillsdale, NJ: Lawrence Erlbaum, 27–48.

Rosch, E./Mervis, C. B. (1975). Family resemblances: Studies in the internal structure of categories. *Cognitive Psychology* 7: 4, 573–605.

Rosch, E./Mervis, C. B./Gray, W. D./Johnson, D. M./Boyes-Braem, P. (1976). Basic objects in natural categories. *Cognitive Psychology* 8: 3, 382–439.

Rostila, J. (2011). Wege zur konstruktiven Kritik der Konstruktionsgrammatik. *Zeitschrift für Germanistische Linguistik* 39: 1, 120–134.

Rothweiler, M. (2002). Spracherwerb. In: Meibauer, J./Demske, U./Geilfuß-Wolfgang, J./Pafel, J./Ramers, K. H.; Rothweiler, M./Steinbach, M. (Eds.), *Einführung in die germanistische Linguistik*. Stuttgart, Weimar: J. B. Metzler, 251–293.

Rothweiler, M. (2007). Bilingualer Spracherwerb und Zweitspracherwerb. In: Steinbach, M. (Ed.), *Schnittstellen in der germanistischen Linguistik*. Stuttgart, Weimar: J. B. Metzler, 101–135.

Roy, B. C./Frank, M. C./Roy, D. (2012). Relating activity contexts to early word learning in dense longitudinal data. *Proceedings of the 34th Annual Meeting of the Cognitive Science Society.* Sapporo, Japan.

Roy, D. (2009). New horizons in the study of child language acquisition. *Proceedings of Interspeech 2009*. Brighton, UK.

Ruesch, J./Kees, W. (1969). *Nonverbal communication.* Berkeley, Los Angeles: University of California Press.

Sagae, K./MacWhinney, B./Lavie, A. (2004). Automatic parsing of parent-child interactions. *Behavior Research Methods, Instruments, and Computers* 36, 113–126.

Saunders, B. (2000). Revisiting basic color terms. *The Journal of the Royal Anthropological Institute* 6: 1, 81–99.

Scheller, J. (2009). *Animationen in der Grammatikvermittlung. Multimedialer Spracherwerb am Beispiel von Wechselpräpositionen*. Berlin, Münster: Lit.

Schippan, T. (2002). *Lexikologie der deutschen Gegenwartssprache* (2., unveränderte Aufl.). Tübingen: Max Niemeyer.

Schmid, H.-J. (2014). *A Framework for Understanding Linguistic Entrenchment and its Psychological Foundations in Memory and Automatization*. [http://www.anglistik.uni-muenchen.de/personen/professoren/schmid/schmid_publ/introduction_entrenchment.pdf, 20. May 2014].

Schmid, M. S./Köpke, B./Keijzer, M./Weilemar, L. (Eds.) (2004). *First Language Attrition: Interdisciplinary Perspectives on Methodological Issues*. Amsterdam, Philadelphia: John Benjamins.

Schnotz, W. (2001). Kognitive Prozesse bei der sprach- und bildgestützten Konstruktion mentaler Modelle. In: Sichelschmidt, L./Strohner, H. (Eds.), *Sprache, Sinn und Situation. Festschrift für Gert Rickheit zum 60. Geburtstag*. Wiesbaden: Deutscher Universitäts-Verlag, 43–57.

Schnotz, W. (2003). Multimediales Lernen: Versprechungen, Befunde, Perspektiven. In: Schwill, A. (Ed.), *Grundfragen multimedialer Lehre. Tagungsband des 1. Workshops GML 2003*. Potsdam: Universität Potsdam, 17–28.

Schnotz, W./Bannert, M. (1999). Einflüsse der Visualisierungsform auf die Konstruktion mentaler Modelle beim Text- und Bildverstehen. *Zeitschrift für Experimentelle Psychologi*e 46: 3, 217–236.

Schnotz, W./Bannert, M. (2003). Construction and interference in learning from multiple representation. *Learning and Instruction* 13: 2, 141–156.

Schnotz, W./Lowe, R. (2008). A unified view of learning from animated and static graphics. In: Lowe, R./Schnotz, W. (Eds.), *Learning with Animation: Research Implications for Design*. Cambridge, New York: Cambridge University Press, 304–356.

Schnotz, W./Rasch, T. (2005). Enabling, facilitating, and inhibiting effects of animations in multimedia learning: Why reduction of cognitive load can have negative results on learning. *Educational Technology Research and Development* 53: 3, 47–58.

Schnotz, W./Rasch, T. (2008). Functions of animation in comprehension and learning. In: Lowe, R./Schnotz, W. (Eds.), *Learning with Animation: Research Implications for Design*. Cambridge, New York: Cambridge University Press, 92–113.

Schnotz, W./Rasch, T. (2009). Interactive and non-interactive pictures in multimedia learning environments: Effects on learning outcomes and learning efficiency. *Learning and Instruction* 19: 5, 411–422.

Schröder, C./Höhle, B. (2011). Prosodische Wahrnehmung im frühen Spracherwerb. *Sprache – Stimme – Gehör* 35, e91–e98.

Schütze, S./Streule, R./Läge, D. (2011). Warum klassische Evaluation oftmals nicht ausreicht. Eine Studie zur Ermittlung der Bedeutsamkeit Mentaler Modelle als Evaluationsmethode. In: Köhler, T./Neumann, J. (Eds.), W*issensgemeinschaften. Digitale Medien – Öffnung und Offenheit in Forschung und Lehre*. Münster u.a.: Waxmann, 273–283.

Schwarz, M./Chur, J. (2004). *Semantik: Ein Arbeitsbuch* (4., aktual. Aufl.). Tübingen: Narr.

Schwarz, M./Chur, J. (2007). *Semantik. Ein Arbeitsbuch* (5. Aufl.). Tübingen: Narr.

Seel, N. M. (1991). *Weltwissen und mentale Modelle*. Göttingen: Hogrefe.

Seel, N. M. (1999). Educational diagnosis of mental models: Assessment problems and technology-based solutions. *Learning and Intelligent Systems* 14: 2, 153–185.

Seel, N. M. (2003). *Psychologie des Lernens. Lehrbuch für Pädagogen und Psychologen* (2. Aufl.). München, Basel: E. Reinhardt.

Seyfeddinipur, M. (2006). *Disfluency: Interrupting Speech and Gesture*. (MPI Series in Psycholinguistics 39). Nijmegen: University of Nijmegen.

Shute, V. J./Zapata-Rivera, D. (2008). Using an evidence-based approach to assess mental models. In: Ifenthaler, D./Pirnay-Dummer, P./Spector, J. M./Seel, N. M. (Eds.), *Understanding Models for Learning and Instruction: Essays in Honor of Norbert M. Seel*. New York, London: Springer, 23–41.

Sime, D. (2006). What do learners make of teachers' gestures in the language classroom? *International Review of Applied Linguistics* 44: 2, 209–228.

Sime, D. (2008). "Because of her gesture, it's very easy to understand". Learners' perceptions on teachers' gestures in the foreign language class. In: McCafferty, S./Stam, G. (Eds.), *Gesture. Second Language Acquisition and Classroom Research*. New York, London: Routledge, 259–279.

Sinha, C./da Silva Sinha, V./Zinken, J./Sampaio, W. (2011). When time is not space: The social and linguistic construction of time intervals and temporal event relations in an Amazonian culture. *Language and Cognition* 3: 1, 137–169.

Sinha, C./Jensen de López, K. (2000). Language, culture and the embodiment of spatial cognition. *Cognitive Linguistics* 11: 1–2, 17–41.

Skinner, B. F. (1957). *Verbal Behavior.* Acton, MA: Copley.

Skulmowski, A./Rey, G. D. (2018). Embodied learning: Introducing a taxonomy based on bodily engagement and task integration. *Cognitive Research: Principles and Implications* 3, 6. https://doi.org/10.1186/s41235-018-0092-9.

Slama-Cazacu, T. (1976). Nonverbal components in message sequence: "Mixed syntax". In: McCormack, W. C./Wurm, S. A. (Eds.), *Language and Man: Anthropological Issues*. The Hague: Mouton, 217–227.

Slobin, D. I. (1985). *The Cross-Linguistic Study of Language Acquisition.* Hillsdale, NJ: Lawrence Erlbaum.

Slobin, D. I. (1996). From 'thought and language' to 'thinking for speaking'. In: Gumperz, J. J./Levinson, S. C. (Eds.), *Rethinking Linguistic Relativity.* Cambridge: Cambridge University Press, 70–96.

Slobin, D. I. (2004). The many ways to search for a frog: linguistic typology and the expression of motion events. In: Strömqvist, S./Verhoeven, L. (Eds.), *Relating Events in Narrative: Typological and Contextual Perspectives*, Vol. 2. New York, London: Psychology Press, 219–257.

Slobin, D. I./Hoiting, N. (1994). Reference to movement in spoken and signed languages: Typological considerations. *Proceedings of the Annual Meeting of the Berkeley Linguistics Society* 20: 1, 487–505.

Smirnova, E./Mortelmans, T. (2010). *Funktionale Grammatik: Konzepte und Theorien*. Berlin, New York: De Gruyter.

Smith, J. P./diSessa, A. A./Roschelle, J. (1993). Misconceptions reconceived: A constructivist analysis of knowledge in transition. *The Journal of the Learning Sciences* 3: 2, 115–163.

Spiegel (2014). „*Forbes" kürt Merkel erneut zur mächtigsten Frau der Welt* [http://www.spiegel.de/politik/deutschland/forbes-kuert-angela-merkel-zur-maechtigsten-frau-derwelt-a-972235.html, 8. August 2017].

Stam, G./McCafferty, S. (2008). Gesture studies and second language acquisition: A review. In: McCafferty, S. G./Stam, G. (Eds.), *Gesture: Second Language Acquistion and Classroom Research*. New York, London: Routledge, 3–24.

Stanfield, R. A./Zwaan, R. A. (2001). The effect of implied orientation derived from verbal context on picture recognition. *Psychological Science* 12: 2, 153–156.

Stangl, U. (2010). Grammatikbeschreibung im Wandel. Von der Grammatiktradition des Mittelalters bis zur Beschreibung von Sprachen der Neuen Welt. *Helikon: A Multidisciplinary Journal* 1, 78–88.

Steels, L. (2013). Fluid construction grammar. In: Hoffmann, T./Trousdale, G. (Eds.), *The Oxford Handbook of Construction Grammar*. Oxford, New York: Oxford University Press, 153–176.

Stefanowitsch, A. (2008). R-Relationen im Sprachvergleich: Die Direkte-Rede-Konstruktion im Englischen und Deutschen. In: Stefanowitsch, A./Fischer, K. (Eds.), *Konstruktionsgrammatik II: Von der Konstruktion zur Grammatik.* Tübingen: Stauffenburg, 247–261.

Steffens, D./al-Wadi, D. (2015). *Neuer Wortschatz: Neologismen im Deutschen 2001-2010*, 2 Bände. Mannheim: Institut für Deutsche Sprache.

Steffens, D./Nikitina, O. (2014). *Deutsch-russisches Neologismenwörterbuch. Neuer Wortschatz im Deutschen 1991-2010*. Institut für Deutsche Sprache, Mannheim.

Stern, C./Stern, W. (1928). *Die Kindersprache. Eine psychologische und sprachtheoretische Untersuchung* (4., neubearb. Aufl.). Leipzig: Barth.

Streeck, J. (1994). Gesture as communication II: The audience as co-author. *Research on Language and Social Interaction* 27: 3, 239–267.

Streeck, J. (2002). Grammars, words, and embodied meanings: On the uses and evolution of so and like. *The Journal of Communication* 52: 3, 581–596.

Streeck, J. (2009). *Gesturecraft: The Manu-Facture of Meaning*. Amsterdam, Philadelphia: John Benjamins.

Strietz, M./Kopchuk, L. (2009). Metaphern in Deutsch als Fremdsprache. In: Goncharova, E./Kopchuk, L./Schumacher, N./Strietz, M. (Eds.), *Arbeitspapiere GIP Herzen – Humboldt. Themenheft 1: Tempus – Metaphern – Text*. St. Petersburg, Izdatel'stvo SPbGPU, 82–102.

Stukenbrock, A. (2015). *Deixis in der face-to-face-Interaktion*. Berlin, München, Boston: De Gruyter.

Sueyoshi, A./Hardison, D. M. (2005). The role of gestures and facial cues in second language listening comprehension. *Language Learning* 55: 4, 661–699.

Suñer Muñoz, F./Roche, J. (2021). Embodiment in concept-based L2 grammar teaching: The case of German light verb constructions. *International Review of Applied Linguistics in Language Teaching* 59: 3, 421–447.

Szagun, G. (2013). *Sprachentwicklung beim Kind. Ein Lehrbuch* (5., aktual. Aufl.). Weinheim, Basel: Beltz.

Talmy, L. (1978). Figure and ground in complex sentences. In: Greenberg, J. H./Ferguson, C. A./Moravcsik, E. A. (Eds.), *Universals of Human Language,* Vol. 4: Syntax. Stanford, CA: Stanford University Press, 625–649.

Talmy, L. (2000). *Toward a Cognitive Semantics,* Vol. 1 and 2. Cambridge: MIT Press.

Tavoni, M. (2000). The traditional study of Latin at the university in the age of Humanism. In: Auroux, S./Körner, E. F. K./Niederehe, H.-J./Versteegh, K. (Eds.), *History of the Language Sciences: An international Handbook on the Evolution of the Study of Language from the Beginnings to the Present*, Vol. 1. Berlin, New York: De Gruyter, 650–656.

Taylor, J. R. (1989). *Linguistic Categorization: Prototypes in Linguistic Theory*. Oxford: Clarendon Press.

Taylor, J. R. (2002). *Cognitive Grammar*. Oxford, New York: Oxford University Press.

Tellier, M. (2006). *L'impact du geste pédagogique sur l'enseignement-apprentissage des étrangères: Etude sur des enfants de 5 ans*. Doctorat. Paris, University Paris 7 – Denis Diderot.

Teßendorf, S. (2014). Pragmatic and metaphoric – combining functional with cognitive approaches in the analysis of the "brushing aside gesture". In: Müller, C./Cienki, A./Fricke, E./Ladewig, S./McNeill, D./Bressem, J. (Eds.), *Body – Language – Communication: An International Handbook on Multimodality in Human Interaction*, Vol. 2. Berlin, München, Boston: De Gruyter Mouton, 1540–1558.

Tomasello, M. (2000a). Do young children have adult syntactic competence? *Cognition* 74: 3, 209–253.

Tomasello, M. (2000b). The item-based nature of children's early syntactic development. *Trends in Cognitive Sciences* 4: 4, 156–163.

Tomasello, M. (2001). Perceiving intentions and learning words in the second year of life. In: Bowerman, M./Levinson, S. C. (Eds.), *Language Acquisition and Conceptual Development.* Cambridge: Cambridge University Press, 132–158.

Tomasello, M. (2003). *Constructing a Language. A Usage-Based Theory of Language Acquisition*. Cambridge, MA: Harvard University Press.

Tomasello, M. (2008). *Origins of Human Communication*. Cambridge, MA: MIT Press.

Tomasello, M. (2009). The usage-based theory of language acquisition. In: Bavin, E. L. (Ed.), *The Cambridge Handbook of Child Language.* Cambridge: Cambridge University Press, 69–87.

Tomasello, M./Barton, M. E. (1994). Learning words in nonostensive contexts. *Developmental Psychology* 30: 5, 639–650.

Tomasello, M./Brooks, P. (1998). Young children's earliest transitive and intransitive constructions. *Cognitive Linguistics* 9: 4, 379–395.

Tomasello, M./Call, J. (1997). *Primate Cognition*. New York, Oxford: Oxford University Press.

Tomasello, M./Carpenter, M. (2011). Geteilte Intentionalität. In: Hoffmann, L./Leimbrink, K./Quasthoff, U. (Eds.), *Die Matrix der menschlichen Entwicklung*. Berlin, Boston: De Gruyter, 83–95.

Tracy, R. (1996). Vom Ganzen und seinen Teilen: Überlegungen zum doppelten Erstspracherwerb. *Sprache & Kognition. Zeitschrift für Sprach- und Kognitionspsychologie und ihre Grenzgebiete* 15: 1–2, 70–92.

Tracy, R. (2007). Wie viele Sprachen passen in einen Kopf? Mehrsprachigkeit als Herausforderung für Gesellschaft und Forschung. In: Anstatt, T. (Ed.), *Mehrsprachigkeit bei Kindern und Erwachsenen: Erwerb, Formen, Förderung*. Tübingen: Attempto, 69–92.

Tracy, R. (2008). *Wie Kinder Sprachen lernen. Und wie wir sie dabei unterstützen können* (2., überarb. Aufl.). Tübingen: Francke.

Tracy, R./Gawlitzek-Maiwald, I. (2000). Bilingualismus in der frühen Kindheit. In: Grimm, H. (Ed.), *Sprachentwicklung. Enzyklopädie der Psychologie*, Bd. 3: Sprache. Göttingen u.a.: Hogrefe, 495–535.

Trakl, G. [1913] (1972). *Das dichterische Werk*. Auf Grund der historisch-kritischen Ausgabe von W. Killy und H. Szklenar bearbeitet von F. Kur. München: Deutscher Taschenbuchverlag [English translation: http://www.literaturnische.de/Trakl/english/ged-e.htm, 8. August 2023].

Tranströmer, T. (1996). *April och tystnad. In Sorgegondolen*. Stockholm: Albert Bonniers Förlag.

Tuite, K. (1993). The production of gesture. *Semiotica* 93: 1–2, 83–106.

Turner, M. (1993). An image-schematic constraint on metaphor. In: Geiger, R./Rudzka-Ostyn, B. (Eds.), *Conceptualizations and Mental Processing in Language*. Berlin, New York: Mouton De Gruyter, 291–306.

Tyler, A. (2012). *Cognitive Linguistics and Second Language Learning: Theoretical Basics and Experimental Evidence*. New York: Routledge.

Tyler, A./Evans, V. (2001). Reconsidering prepositional polysemy networks: The case of over. *Language* 77: 4, 724–765.

Tyler, A./Mueller, C. M./Ho, V. (2011). Applying cognitive linguistics to learning the semantics of English to, for and at: An experimental investigation. *Vigo International Journal of Applied Linguistics* 8, 181–205.

Ungerer, F. H. (2007). Word-formation. In: Geeraerts, D./Cuyckens, H. (Eds.), *The Oxford Handbook of Cognitive Linguistics*. Oxford, New York: Oxford University Press, 650–675.

Ungerer, F. H./Schmid, H.-J. (1996). *An Introduction to Cognitive Linguistics*. London u.a.: Longman.

Ungerer, F. H./Schmid, H.-J. (1998). Englische Komposita und Kategorisierung. In: Ungerer, F. (Ed.), *Kognitive Lexikologie und Syntax*. Rostock: Universität Rostock, 77–98.

Ungerer, T./Hartmann, S. (2023). *Constructionist Approaches: Past, Present, Future* (Elements in Construction Grammar). Cambridge: Cambridge University Press.

van der Auwera, J./Nuyts J. (2007). Cognitive linguistics and linguistic typology. In: Geeraerts, D./Cuyckens, H. (Eds.), *The Oxford Handbook of Cognitive Linguistics*. Oxford, New York: Oxford University Press, 1074–1091.

Varela, F. J./Thompson, E./Rosch, E. (1991). *The Embodied Mind: Cognitive Science and Human Experience*. Cambridge, MA: MIT Press.

Volterra, V./Taeschner, T. (1978). The acquisition and development of language by bilingual children. *Journal of Child Language* 5: 2, 311–326.

von Humboldt, W. (1910). *Wilhelm von Humboldts ausgewählte philosophische Schriften*. Leipzig: Verlag der Dürr'schen Buchhandlung.

Vygotsky, L. S. (1992). *Thought and Language.* Translated and edited by A. Kozulin (6th ed.). Cambridge, MA: MIT Press (Original work published 1986).

Wasserscheidt, P. (2014). Constructions do not cross Languages: On cross-linguistic generalizations of constructions. *Constructions & Frames* 6: 2, 305–337.

Wasserscheidt, P. (2015). *Bilinguales Sprechen. Ein konstruktionsgrammatischer Ansatz*. Dissertation. Berlin, Freie Universität.

Watkins, K. E./Dronkers, N. F./Vargha-Khadem, F. (2002). Behavioural analysis of an inherited speech and language disorder: Comparison with acquired aphasia. *Brain* 125: 3, 452–464.

Weininger, A. (2013). Grundlagen, Funktionen und kognitive Potentiale alltagssprachlicher Metaphern im Fremdsprachenunterricht. *Zeitschrift für Interkulturellen Fremdsprachenunterricht* 18: 1, 21–34.

Weinrich, H. (1963). Semantik der kühnen Metapher. *Deutsche Vierteljahrsschrift für Literaturwissenschaft und Geistesgeschichte* 37: 3, 325–344.

Weinrich, H. (1971). *Literatur für Leser. Essays und Aufsätze zur Literaturwissenschaft*. Stuttgart: Kohlhammer.

Weinrich, H. (1993). *Textgrammatik der deutschen Sprache*. Mannheim u.a.: Dudenverlag.

Weissenborn, J. (2000). Der Erwerb von Morphologie und Syntax. In: Grimm, H. (Ed.), *Sprachentwicklung. Enzyklopädie der Psychologie*, Bd. 3: Sprache. Göttingen u.a.: Hogrefe, 141–169.

Welke, K. (1994). Thematische Relationen. Sind thematische Relationen semantisch, syntaktisch oder/und pragmatisch zu definieren? *Deutsche Sprache* 22, 1–18.

Welke, K. (2005). *Deutsche Syntax funktional* (2., bearb. Aufl.). Tübingen: Stauffenburg.

Welt (2013). *Merkel, die mächtige* [https://www.welt.de/newsticker/dpa_nt/infoline_nt/thema_nt/article123041657/Merkel-die-Maechtige.html, 8. August 2017].

Werker, J. F./Tees, R. C. (1983). Developmental changes across childhood in the perception of non-native speech sounds. *Canadian Journal of Psychology* 37: 2, 278–286.

Wermke, K. (2008). Melodie und Rhythmus in Babylauten und ihr potenzieller Wert zur Frühindikation von Sprachentwicklungsstörungen. *Logos Interdisziplinär* 16: 3, 190–195.

Wik, P./Hjalmarsson, A. (2009). Embodied conversational agents in computer assisted language learning. *Speech Communication* 51: 10, 1024–1037.

Will, I. (2021). *Recurrent Gestures of Hausa Speakers*. Boston: Brill.

Wilson, R. A./Foglia, L. (2017). Embodied cognition. In: Zalta, E. N. (Ed.), *The Stanford Encyclopedia of Philosophy* (Spring 2017 Edition). Metaphysics Research Lab, Stanford, CA: Stanford University [https://plato.stanford.edu/archives/spr2017/entries/embodied-cognition/. 29. September 2017].

Winawer, J./Witthoft, N./Frank, M. C./Wu, L./Wade, A. R./Boroditsky, L. (2007). Russian blues reveal effects of language on color discrimination. *Proceedings of the National Academy of Sciences* 104: 19, 7780–7785.

Wolff, P./Holmes, K. J. (2010). Linguistic relativity. *Wiley Interdisciplinary Reviews. Cognitive science* 2: 3, 253–265.

Wray, A./Perkins, M. R. (2000). The functions of formulaic language: An integrated model. *Language & Communication* 20: 1, 1–28.

Yasuda, S. (2010). Learning Phrasal Verbs Through Conceptual Metaphors: A Case of Japanese EFL Learners. *TESOL quarterly* 44: 2, 250–273.

Yoon, S./Anderson, E./Lin, J./Elinich, K. (2017). How Augmented Reality Enables Conceptual Understanding of Challenging Science Content. *Educational Technology & Society* 20: 1, 156–168.

Ziem, A. (2014). Konstruktionsgrammatische Konzepte eines Konstruktikons. In: Lasch, A./Ziem, A. (Eds.), *Grammatik als Netzwerk von Konstruktionen. Sprachwissen im Fokus der Konstruktionsgrammatik*. Berlin: De Gruyter, 15–34.

Ziem, A./Lasch, A. (2013). *Konstruktionsgrammatik. Konzepte und Grundlagen gebrauchsbasierter Ansätze*. Berlin, Boston: de Gruyter.

Zlatev, J./Blomberg, J. (2015). Language may indeed influence thought. *Frontiers in Psychology* 6, 1–10.

Zwaan, R. A./Singer, M. (2003). Text comprehension. In Graesser, A. C./Gernsbacher, M. A./Goldman, S. R. (Eds.), *Handbook of Discourse processes*. Mahwah, NJ: Lawrence Erlbaum, 83–121.

List of Illustrations

Chapter 1

Figure 1.1: Cognitive linguistics consists of many different research areas that are united by basic assumptions about the nature of language; own illustration.

Figure 1.2: Cat; Pixabay (2018). https://pixabay.com/de/katze-haustier-gestreift-k%C3%A4tzchen-1192026/.

Figure 1.3: Common type of objects categorized as FURNITURE; ClipartPanda (2017). monitor: http://images.clipartpanda.com/screen-clipart-monitor.svg; chair: http://images.clipartpanda.com/chair-clipart-wooden-chair.svg; bed: http://images.clipartpanda.com/bed-clipart-double_Bed_blue.png.

Figure 1.4: Comic illustrating the different meanings of the word *cookie*; Fernandez (2017). https://laughingsquid.com/cookie-monster-no-want-to-delete-cookies/.

Figure 1.5: Comic illustrating the metaphorical roots of some common expressions; Scott, J./Borgman, J. (2011). http://zitscomics.com/comics/february-25–2011/; © King Features Syndicate, Inc./Distr. Bulls.

Figure 1.6: Case inflection in Greek, for nouns that end with the vowel o (declination for masculine and neuter nouns) (logo, demo, man, road, gift); Kaegi, A. (1958). *Kurzgefasste Griechische Schulgrammatik*. 59. Aufl. Berlin: Weidmannsche Verlagsbuchhandlung, 18.

Figure 1.7: An image representing the meaning of the Japanese word *tsundoku*; Sanders, E. F. (2014). *Lost in Translation: An Illustrated Compendium of Untranslatable Words from Around the World*. New York: Penguin Random House, 87.

Figure 1.8: Static spatial situation: *The lamp is on the table*; Lara Jessen.

Figure 1.9: Rubin vase. The image oscillates between a vase (in white) and two faces looking at each other (in black); Wikimedia (2017). https://commons.wikimedia.org/wiki/File:Two_silhouette_profile_or_a_white_vase.jpg.

Figure 1.10: Image schemas of *above* and *below*; Langacker, R. W. (2008a). *Cognitive Grammar: A Basic Introduction*. Oxford, New York: Oxford University Press, 71.

Figure 1.11: Image schemas for three different *out*-schemas; Johnson, M. (1987). *The Body in the Mind: The Bodily Basis of Meaning, Imagination, and Reason*. Chicago, London: University of Chicago Press, 32.

Figure 1.12: A polysemy network of *over*; Tyler, A./Evans, V (2001). Reconsidering prepositional polysemy networks: The case of over. *Language* 77: 4, 746.

Figure 1.13: Is the mountain range static or moving?; Bernhard Krichbaumer.

Figure 1.14: Does the scar extend from the elbow or from the wrist?; Lara Jessen.

Figure 1.15: René Descartes' illustration of the mind and the body; https://instantkaamos.wordpress.com/tag/rene-descartes.

Figure 1.16: A comic illustrating the metaphorical aspect of the term 'mirror neuron'; Ufer, M. (2018).

Figure 1.17: Activation in brain areas controlling movement of the feet, fingers, and tongue in response to leg-, arm-, and face-related words; Pulvermüller, F. (2005). Brain mechanisms linking language and action. *Nature Reviews Neuroscience* 6: 7, 576.

Figure 1.18: Stimuli similar to those used in the orientation experiment by Stanfield & Zwaan 2001; Bergen, B. K. (2012). *Louder than Words: The New Science of How the Mind Makes Meaning*. New York: Basic Books, 55.

Chapter 2

Figure 2.1: House (prefab Hartlhaus); Hartlhaus (2017). https://www.hartlhaus.it/haeuser.

Figure 2.2: Squatter; Wikipedia (2017a). https://de.wikipedia.org/wiki/Hausbesetzung#/media/File:Instandbesetzer_Berlin_Kreuzberg_1981.jpg.

Figure 2.3: Snail shell; Pixabay (2018). https://pixabay.com/de/schneckenhaus-strand-1496269/.

Figure 2.4: Dwelling; Katsiaryna EL-Bouz.

Figure 2.5: Concept of a hypotenuse; own illustration (2020).

Chapter 3

Chapter 4

Chapter 5

Figure 5.1: Kinship terms in Kayardild; adopted from Evans, N. (1985). *Kayardild: The language of the Bentinck Islanders of North West Queensland*. PhD Thesis. Canberra, Australian National University, 484.

Figure 5.2: Stimuli representing a spatial relation possible to describe with different spatial frames of reference; Katsiaryna EL-Bouz.

Figure 5.3: Illustration of the three different spatial frames of reference; adopted from Levinson, S. C. (2003). *Space in Language and Cognition*. Cambridge: Cambridge University Press, 40.

Figure 5.4: Satellite- and Verb-framing in English and Spanish; Blomberg, J. (2014). *Motion in Language and Experience: Actual and Non-actual Motion in Swedish, French, and Thai*. PhD Thesis. Lund: Media-Tryck, 49.

Figure 5.5: The body coloring task; van Staden, M./Majid, A. (2006). Body coloring task. *Language Sciences* 28, 160.

Figure 5.6: A comic strip commenting on the debate over linguistic relativity; Speed Bump (2006). Reprinted with permission from Dave Coverly.

Figure 5.7: Typology of basic color terms; adapted from the proposed typology from Berlin, B./Kay, P. (1969). *Basic Color Terms: Their Universality and Evolution*. Berkeley, Los Angeles: University of California Press, 4.

Figure 5.8: The experimental setup with relative and absolute solutions; Majid, A./Bowerman, M./Kita, S./Haun, D. B. M./Levinson, S. C. (2004). Can language restructure cognition? The case for space. *Trends in Cognitive Sciences* 8: 3, 110.

Figure 5.9: Example of a gesture indicating a *past-is-front* mapping; Nuñez, R./Sweetser, E. (2006). With the future behind them: Convergent evidence from Aymara language and gesture in the crosslinguistic comparison of spatial construals of time. *Cognitive Science* 30, 428.

Chapter 7

Figure 7.1: Linear structure of gestures based on Kendon, A. (2004). *Gesture: Visible Action as Utterance*. Cambridge: Cambridge University Press.

Figure 7.2: Imitation of an action with an object; Ladewig, S. H. (2020). *Integrating Gestures. The Dimension of Multimodality in Cognitive Grammar*. Berlin, Boston: De Gruyter Mouton, 96.

Figure 7.3: *In zehn oder zwanzig Jahren, da sieht die Sache ganz anders aus* (Things will look different in ten or twenty years); gestural embodiment of time metaphors; Müller, C. (2010a). Mimesis und Gestik. In: Koch, G./Vöhler, M./Voss, C. (Eds.), *Die Mimesis und ihre Künste*. Paderborn, München: Fink, 170.

Figure 7.4: Gestural modes of representation; Müller, C. (1998). *Redebegleitende Gesten: Kulturgeschichte, Theorie, Sprachvergleich*. Berlin: Arno Spitz; Müller, C. (2014b). Gestural modes of representation as techniques of depiction. In: Müller, C./Cienki, A./Fricke, E./Ladewig, S. H./McNeill, D./Bressem, J. (Eds.), *Body – Language – Communication: An International Handbook on Multimodality in Human Interaction*, Vol. 2. Berlin, Boston: De Gruyter Mouton, 1687–1702.

Figure 7.5: Repertoire of recurrent gestures determined by Bressem & Müller (2014b); Bressem, J./Müller, C. (2014b). A repertoire of German recurrent gestures with pragmatic functions. In: Müller, C./Cienki, A./Fricke, E./Ladewig, S. H./McNeill, D./Bressem, J. (Eds.), *Body – Language – Communication: An International Handbook on Multimodality in Human Interaction*, Vol. 2. Berlin, Boston: De Gruyter Mouton, 1580–1584.

Figure 7.6: Multimodal reference (*Here!* plus Pointing gesture) to the blackboard; own illustration.

Figure 7.7: Gestural positioning of lexical and/or grammatical units in gesture space; own illustration.

Figure 7.8: Interactive exchange with student; own illustration.

About the Authors

Johan Blomberg is a senior lecturer in general linguistics, Lund University. His research interests include language and thought, semantic typology, and the epistemology of linguistics.

Katsiaryna EL-Bouz is a project manager for strategic and operational IT training coordination at the Munich Municipal Hospital Group Academy, Further Education Department. Earlier, she was a research assistant at the Institute of German as a Foreign Language, LMU Munich. Her research interests include e-learning, cognitive linguistics, language imagery and grammar animations.

Helen Engemann holds a PhD in Theoretical and Applied Linguistics from the University of Cambridge, UK. She is an Assistant Professor of Multilingualism at the University of Mannheim in Germany. Her research focusses on the acquisition, use, and processing of multiple languages in children and adolescents.

Marina Foschi Albert (Doctor of Philosophy, University of Maryland, College Park, Md., 1991) has been a Professor for German Linguistics at the University of Pisa since 2000. She teaches and does research in the fields of text stylistics, poetics, text comprehension, complex structures of German texts, verbal comicity.

Natalya Furashova, PhD, is Head of the Chair of Lexicology of the German Language at MSLU (Minsk State Linguistic University, Minsk, Belarus).

After completing her studies as an academic speech therapist at the LMU Munich, **Katharina Günther** completed her doctorate with a research focus on bilingual language acquisition and construction grammar. She is currently working as a language specialist in a kindergarten.

Anne-Katharina Harr is a Lecturer at the Institute for German as a Foreign Language at Ludwig-Maximilians-Universität, Munich. Her research interests include typical and atypical first language acquisition as well as child and adult second language acquisition.

Marianne Hepp is Full Professor of German Linguistics at the University of Pisa, Italy. Her research interests include text linguistics/text stylistics, typological connections between everyday text and literary texts, multilingual approaches in German L2 teaching, and language policy.

Lena Hotze works as a coordinator in the PROKODIL project at the Center for Teaching and Learning at the European University Viadrina in Frankfurt (Oder). Prior to that, she was research assistant at the Chair of Language Use and Multimodal Communication at the University Viadrina. In the last 10 years, her research interests have been in the areas of multimodal communication together with first and second language acquisition, where she has been involved in various projects and teaching activities.

Moiken Jessen is a postdoctoral researcher at the Professional School of Education, University of Würzburg. Her research interests include second language acquisition from a cognitive linguistics perspective, foreign language teaching and learning, with a specific emphasis on effective pedagogical approaches within linguistically diverse classrooms.

Nikolas Koch is a lecturer (Akademischer Rat a. Z.) at the Chair for German linguistics with a focus on German as a Foreign Language at the Ludwig-Maximilians-Universität München. His research interests are in the area of cognitive linguistics and usage-based models of (bilingual) first and second language acquisition. He specifically focuses on lexically specific patterns (frame-and-slot patterns) and their role in growing syntactic productivity as well as on individual differences in linguistic knowledge.

Silva H. Ladewig is principal investigator (DFG, Eigene Stelle) of the project "Processes of stabilization in gestures. A media-specific and cross-modal approach" at the Sign Lab Göttingen, within the DFG Priority Programme 2329 „Visual Communication. Theoretical, Empirical, and Applied Perspectives (ViCom)". Her research areas are multimodality of language (speech/gesture), language and cognition, cognitive grammar, pragmatics, dynamics of language use (synchron and diachron), gesture sign interface.

Jörg Roche is Professor of German as a Foreign Language at Ludwig-Maximilians-Universität München. His main areas of research include Language Acquisition, Multilingualism, Intercultural Communication, Languages for Special and Vocational Purposes and Language Education.