Abstract Phonology in a Concrete Model

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Abstract Phonology
in a Concrete Model

Cognitive Linguistics and
the Morphology-Phonology Interface

by

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Preface

This book was begun during my 2005/06 sabbatical at the University of North Carolina, Chapel Hill. The manuscript was completed in the following academic year in Tromsø, submitted for publication in April 2007 and finally revised in September 2007.

In August 2005 I remember discussing my ideas for an article on stem alternations in Russian verbs with my host in Chapel Hill, Professor Laura A. Janda. Professor Janda suggested I write a book on the topic. I think I objected "but I already have written a book on Russian verb stem alternations!". However, I soon realized that the new book would be very different and decided to embark on the project. What you have in your hands are the fruits of my labor. The book is indeed very different from my previous monograph (Nesset 1998a) in scope, theory and analysis. "All good things are three", as the saying goes, but I can assure you that this is my second and last book on stem alternations in Russian verbs.

Contents

Note on transliteration and transcription

Examples in italics are given in transliterated orthography. When the sound shape of the examples is relevant, they are rendered in phonemic or phonetic transcription. In accordance with standard practice, phonemic transcription is marked with slashes, while square brackets are used for phonetic transcription. In phonetic transcription, the general policy here is to disregard phonetic detail that is irrelevant to the argument at hand. In chapter 3, which outlines a cognitive approach to phonology, a fairly narrow transcription is necessary. In the rest of the book, a broader transcription is used, as discussed in section 3.10.

Throughout the book, examples are transcribed according to the IPA system. Slavists should note that palatalization is represented as a superscript ^{j} after the relevant consonant, not as an apostrophe as is customary in Slavic linguistics. The symbols [ʂ, z̢, ʃ^j, tʃ^j, ts] represent the first consonants in Russian words such as *šum* 'noise', *žuk* 'beetle', *ščuka* 'pike', *čaj* 'tea', and *cvetok* 'flower'. The first consonant in the Russian words *kislyj* 'sour', *gibkij* 'flexible', *xitryj* 'cunning' are transcribed as [c, ɟ, ç], not as [k', g', x'].

Chapter 1
To cut a long story short

How can the morphology-phonology interface be accommodated in cognitive linguistics? Do morphophonological alternations have a meaning? This book addresses these two questions on the basis of an analysis of two sets of alternations in the Russian verbal stem. The analysis is couched in Cognitive Grammar, a model developed within the larger framework of cognitive linguistics.

1.1.   The morphology-phonology interface
in Cognitive Grammar

The motivation for pursuing the first question is the simple fact that phonology and morphology are underrepresented fields in cognitive linguistics. In the three decades or so of its existence, cognitive linguistics has witnessed several important contributions to these fields, but the main focus of cognitive linguists has been elsewhere. As Taylor (2002:79) remarks laconically, "the bulk of the research in Cognitive Grammar (and cognitive linguistics in general) has been concerned with semantic matters". Early in my career I became fascinated by cognitive linguistics, but I had a hard time figuring out how one would do phonology and morphology in this framework. After all, if cognitive linguistics is advanced as a model of language, it must have something to say about phonology and morphology too. The only recent monograph I could find on the market was Joan Bybee's (2001) *Phonology and Language Use*. The influence of Bybee's masterful study should be felt on virtually every page of the present book. However, while Bybee focuses on explanatory principles, I am more concerned with representation. I want to show how various phenomena can be represented in the formalisms suggested by Langacker (1987, 1991a, 1991b and 1999). I could not find a book that applied Langacker's ideas to phonology and morphology in some detail, so I decided to write the book myself. The result is what you have in your hands.[1]

So how can cognitive linguistics accommodate the morphology-phonology interface? To cut a long story short, I shall argue that we need what I call "second-

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1   While I was working on this book Välimaa-Blum's (2005) textbook *Cognitive Phonology in Construction Grammar* became available. Välimaa-Blum's book applies a somewhat different variety of cognitive linguistics to data from English phonology.

order schemas". In a model without underlying representations and procedural rules, we need a way of explicating relationships between surface forms. This is the job of second-order schemas. In this book I suggest that an analysis where such schemas are pivotal is not only viable, but also delivers specific advantages. The most important of them is restrictiveness. Cognitive linguistics provides an analysis of all phenomena under scrutiny in terms of a parsimonious set of theoretical constructs that all have cognitive motivation. No ad hoc machinery is invoked, and the analysis yields strong empirical predictions.

There are a number of topics that any framework with pretensions of being a model of phonology must be able to account for. We need to address phonological contrast and neutralization. It is furthermore necessary to account for segments, features, natural classes and segment systems. Finally, we must be able to represent (equivalents to) phonological rules and accommodate their interaction, including what is often referred to as "opaque" rule interaction. All these topics will be treated in this book – some in great detail. I would like to suggest that cognitive linguistics provides a simple and insightful approach to all these phenomena.

This book does not pretend to offer a full-fledged theory of morphology in cognitive linguistics. The focus is on morphophonological alternations, i.e. cases where a morpheme has different shapes in different environments.[2] Morphophonological alternations present a threefold challenge: We must describe the relationship between the alternants, explicate the conditioning environment, and clarify the role of the alternation in the language system as a whole. These three issues form the basis for the theory and analysis I propose in this book. The book combines a focus on phonology with emphasis on morphological notions such as inflectional paradigms and features, as well as stems, derivational suffixes and inflectional endings. I would like to suggest that all these structures can be accounted for in straightforward and intuitive ways in cognitive linguistics.

In the title of this book I use the term "abstract phonology", because in the SPE tradition from Chomsky and Halle (1968) morphophonology is included in the phonological component of the grammar, which applies series of ordered, procedural rules to abstract underlying representations. In contrast, Cognitive Grammar is a "concrete" model, insofar as it does not assume procedural rules

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2   For the purposes of the present study I employ the term "morpheme" as a convenient cover term for roots and affixes. The use of this term does not indicate a particular position in the important debate in morphological theory between morpheme-based and so-called realizational frameworks (Matthews 1972, Anderson 1992, Aronoff 1994, Stump 2001). This debate is tangential to the issues explored in the present book, but, as we shall see later in this chapter, there are some similarities between realizational frameworks and Cognitive Grammar.

or underlying representations. The purpose of this book is to show how abstract phonology can be accounted for in a concrete model. To this end, I explore the interaction of phonology and morphology. This is why the term "interface" was used in the beginning of this chapter. However, the term is misleading in that it might suggest that morphology and phonology occupy autonomous modules in grammar, and that they are only connected through an "interface" that sorts out the minor details not accounted for within a single module. Such a view would be at variance with fundamental ideas in cognitive linguistics. The approach adopted in this book is that phonology and morphology are deeply integrated aspects of grammar and that they interact closely. We shall see examples where morphological schemas gain support from phonology, but we shall also see that the inventory of phonological segments constrain morphophonological alternations. Examples of this type are not exceptional or problematic in cognitive linguistics, but fall out as natural consequences of the fundamental principles of the framework.[3]

In order to accommodate the interaction of morphology and phonology, I develop a theory of alternations in Cognitive Grammar. This theory facilitates detailed analyses with particular emphasis on the environment that conditions the alternation, the relationship between the alternants, as well as the role of the alternation in the language system as a whole. In addition, the theory has implications for a number of larger theoretical issues. A longstanding issue in phonology is abstractness. How different are underlying representations from the observable surface forms? The answer to the abstractness question proposed in this book is as simple as it is radical. Since Cognitive Grammar does not have underlying representations, there is no abstractness in the technical sense. The message to the reader is this: Insightful and restrictive analyses are possible without abstractness.

Another important issue in phonological theory is opacity. How do we handle cases where a phonological process applies although its conditioning environment is not present on the surface? How do we accommodate examples where a phonological process does not apply even though its conditioning environment is present on the surface? These questions have been the subject of lively

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3   Dressler (1985:1) argues that "[a]ny conceivable definition of morphophonology must be derivative: Whereas semantics, syntax, morphology, phonology can be defined within their own respective domains without referring to one another, a definition of morphophonology must be derived from previously defined morphology and phonology." I don't take this to be an argument for autonomous modules for phonology and morphology, but rather for the program of this book, which attempts to isolate the impact of phonological and morphological factors in morphophonological alternations.

discussions in Optimality Theory, but not in cognitive linguistics. On the basis of examples from Russian, in this book I argue that opacity results from the misidentification of morphologically conditioned alternations as phonologically conditioned. Once the morphological environment is correctly described, the opacity problem disappears.

The analysis presented in this book has implications for theoretical issues beyond phonology and morphology. One such issue is the nature of generalizations in linguistics – are they "source-oriented" or "product-oriented"? Traditional rule-based frameworks are designed to capture source-oriented generalizations; the rules single out a set of inputs ("sources") and apply procedures to them. Product-oriented generalizations, on the other hand, characterize surface structures without specifying how they have been generated. In this book, we shall see that Cognitive Grammar's ability to capture product-oriented generalizations is an important success factor. Without product-oriented generalizations, important insights would be overlooked.

A question that has occupied linguists for decades is modularity. Do grammars consist of independent, largely self-contained modules that perform different tasks? Discussion of all facets of this issue is beyond the scope of the present study. However, my analysis illustrates the practical advantages of a non-modular approach to grammar, where phonology, morphology and syntax are not relegated to different modules, but rather interact directly in category networks.

1.2.   The meaning of alternations and the truncation-softening conspiracy

Instead of illustrating each theoretical issue with an eclectic set of data from various languages, I have chosen to present a coherent analysis of one phenomenon in one language, viz. stem alternations in the Russian verb. There are two reasons for this. First of all, I believe that the potential of a theoretical framework is not evident before one grinds through a significant chunk of a language in great detail. In this way, I show that Cognitive Grammar holds up to the complexity of a whole system, not just isolated phenomena. However, I try to balance the need for in-depth analysis against the need to illustrate a wide variety of theoretical issues. I avoid spending much time and ink on phenomena pertaining to small and non-productive classes, if they do not shed light on important theoretical problems. Although the chapters are organized so as to build up my analysis of the Russian verbal stem gradually, the titles of each chapter indicate which theoretical topics are explored where. I have written each chapter in a way that

makes it possible to read them largely independently. Furthermore, chapters 3 and 4 provide short discussions of most relevant theoretical issues with references to the in-depth discussions later in the book. If you are interested in, say, how neutralization can be accounted for in cognitive linguistics, you can look up the sections in chapter 3 with "neutralization" in the heading. There you will find brief expositions with pointers to more detailed discussions later in the book.

The second reason to focus on the Russian verb stem is that I have a story to tell about it. This takes us to the second question mentioned in the beginning: do morphophonological alternations have a meaning? From the perspective of a traditional generative model with abstract underlying representations and procedural rules, the alternations we observe in surface forms are the results of phonological rules. Surface alternations destroy the perfect order in the underlying representation where each morpheme has clear-cut boundaries and one and only one form. In other words, given a rule-based analysis, morphophonological alternations represent a mere complication of the language, so the question arises: why do speakers tolerate them? Even though speakers seem to have a high tolerance for various idiosyncrasies, it is tempting to believe that one reason why speakers tolerate morphophonological alternations is that they have a function. In this book I shall argue that the stem alternations in the Russian verb have a semiotic function. In other words, these morphophonological alternations have a meaning.

In focusing on the ability of morphophonological alternations to carry meaning, my approach is a continuation of a long, structuralistic tradition where it is common to talk about the "semantization" of alternations (cf. Maslov 2004:760ff.). There is also a close connection between Cognitive Grammar and Natural Morphology (Dressler et al. 1987), which "emphasizes the semiotic basis of morphology" (Dressler and Gagarina 1999:754). The approach I adopt in this book furthermore has affinities to realizational approaches to morphology (e.g. Matthews 1972). In frameworks of this type, alternations modifying the shape of a stem can be analyzed as non-segmental formatives that realize inflectional features. In this way such frameworks relate alternations directly to inflectional features, which carry grammatical meaning.

However, there is a twist to the story that is hard to account for in rule-based frameworks. As mentioned in the previous section, such frameworks are designed to capture source-oriented generalizations. However, I shall argue that in order to arrive at an adequate analysis of the Russian verb we need product-oriented generalizations. This book focuses on two classes of alternations in Russian. The first one is often referred to in procedural terms as "truncation", because the stem has a shorter allomorph in parts of the inflectional paradigm. In

this book, I will use the term "truncation alternation" in order to emphasize that what we can observe is an alternation between a longer and a shorter stem. After all, procedural rules that generate the stem alternants from abstract underlying representations are artifacts of a linguistic framework, not part of the observable data. Compare two forms of *pisat'* 'write'. The 3 singular present tense form /pʲiʂ+ot/ has the stem /pʲiʂ/, which is shorter than the stem in the masculine singular past tense form /pʲisa+l/. However, in addition to this zero ∼ vowel alternation, *pisat'* also illustrates the second type of alternation under scrutiny in this book. In the past tense, the root ends in /s/, whereas the present tense has /ʂ/ in root-final position. The /s/ ∼ /ʂ/ alternation is an example of what is traditionally known as "softening". I will use the term "softening alternation" to describe a family of alternations that affect stem-final consonants in Russian verbs. The truncation and softening alternations will be presented in detail in sections 4.6 and 4.7.

What I shall propose is that truncation and softening alternations conspire so as to differentiate the past and present tense stems. In this way, the two classes of alternations fulfill a semiotic function as markers of grammatical meaning. In order to capture this generalization it is not sufficient to describe each alternation in isolation. It is not sufficient to explain how each alternant is generated from an underlying representation. One has to account for the interaction of the alternations, and in order to do that one has to refer to the surface forms, i.e. to what has traditionally been analyzed as the product of morphological processes. As we shall see in this book, such product-oriented generalizations can be captured straightforwardly in Cognitive Grammar.

1.3.   Telling two stories: The structure of the book

I called this chapter "To cut a long story short" because it provides a brief overview of the contribution of this book. However, in fact the book tells not one, but two stories – one for each question stated in the beginning of this chapter. Let us start with the story about the morphology-phonology interface in Cognitive Grammar. Chapters 2–4 focus on the cognitive linguist's toolbox. In chapter 2 I introduce cognitive linguistics and Cognitive Grammar and define a small set of analytical tools to be employed in the remainder of the book. In chapters 3 and 4 the toolbox is applied to fundamental concepts in phonology and morphology. This analysis does not provide entirely new definitions of well-known concepts; the contribution of the present study is to show how all these important concepts are interrelated in that they derive from general cognitive concepts like "schema" and "categorizing relation".

In chapter 5, the toolbox is used to develop a theory of alternations, which is then applied to a number of theoretically important issues in the following chapters. Chapter 6 concerns neutralization, which provides an illustration of the interplay between morphology and phonology. It is argued that both morphological and phonological neutralization can be accounted for in terms of schemas, and that categorizing relationships offer a straightforward account of the morphology-phonology interaction.

The next step in the story is to consider abstractness and alternatives to ordered, procedural rules and underlying representations in chapter 7. Once again, an approach in terms of schemas and categorizing relationships is argued to be not only viable, but also restrictive and explanatory. Chapter 8 topicalizes two important issues, viz. phonological opacity and product-oriented generalizations, which are further explored in chapters 10 and 11. We see that Cognitive Grammar predicts a morphological approach to phonological opacity, which boils down to a characterization of morphological forms and the relationships between them in the inflectional paradigm. Product-oriented generalizations are shown to play a crucial role in the interaction between morphology and phonology, and I claim that Cognitive Grammar offers a straightforward account in terms of schemas. Chapter 10 also discusses the advantages of Cognitive Grammar's non-modular approach to grammar.

The story about the meaning of the stem alternations in the Russian verb unfolds in chapters 5 through 11. Chapter 5 explores the default pattern of the truncation alternation. Contrary to conventional wisdom, I propose that an analysis of the alternation is incomplete unless it incorporates both form and meaning. Cognitive Grammar enables us to capture both aspects of the alternation, and thus facilitates a synthesis of the so-called "One-Stem" and "Two-Stem" systems for the description of Russian conjugation. In this way, the present study not only provides a new analysis of the truncation alternation, but also contributes to the long-standing issue in Slavic linguistics concerning the relative merits of the One-Stem and Two-Stem systems.

In chapters 6, 7 and 8 I further develop the story about the stem alternations by analyzing infinitives, past tense forms and imperatives that deviate from the default pattern described in chapter 5. However, these special cases do not jeopardize the default generalizations. Rather, they constitute well-defined classes, for which simple generalizations can be stated. The generalizations form nested structures where specific statements take precedence over statements of a higher degree of generality.

We turn to the softening alternation in chapters 9–10. On the face of it, the softening alternation is very complex, but I argue that the complexity of the patterns arises from the combined effect of palatalization and lenition. Once

these factors are disentangled, it is argued that broad generalizations can be captured about the relationships between the alternants. Chapter 10 discusses the factors conditioning the softening alternation. The alternation is predictable on the basis of the shape of the stem as well as the shape and meaning of the relevant inflectional endings.

The story about the meaning of the Russian stem alternations is brought to a conclusion in chapter 11, where it is shown that they conspire to mark non-past meaning. Analyzing this "conspiracy" in Cognitive Grammar, we accommodate the fact that the truncation and softening alternations do not constitute arbitrary idiosyncrasies, but rather represent systematic means of conveying semantic content.

Chapter 12 brings together the two stories and sums up the contribution of the book. Cognitive Grammar facilitates a restrictive and explanatory approach to morphology and phonology that enables us to capture the semiotic function of morphophonological alternations.

Chapter 2
Cognitive grammar
and the cognitive linguistics family

This chapter provides a brief introduction to Cognitive Grammar. I offer short comparisons with other frameworks such as traditional rule-based approaches (e.g. the SPE model of Chomsky and Halle 1968) and Optimality Theory (Prince and Smolensky [1993] 2004), and I compare Cognitive Grammar to other approaches in cognitive linguistics. However, my main aim in this chapter is practical. I will fill up my toolbox with all the analytical tools needed later in the book. While the focus is on some key concepts needed for my analysis of stem alternations in Russian verbs, the exposition is also likely to be relevant for cognitive approaches to phonology and morphology in general, since it shows that a parsimonious set of cognitively motivated concepts can suffice to analyze a wide range of linguistic phenomena.

2.1.   Cognitive linguistics and Cognitive Grammar

Cognitive linguistics is a family of broadly compatible theoretical approaches sharing the fundamental assumption that language is an integral part of cognition. As Janda (2000: 4) puts it, "for a cognitive linguist, linguistic cognition is simply cognition". There are no clear-cut boundaries between language and other cognitive abilities, and cognitive linguistics seeks to analyze language by means of theoretical constructs that are based on and compatible with insights from other disciplines of cognitive science. In this way, cognitive linguistics strives to produce psychologically realistic analyses of natural language data. The analyses (including those developed in this book) can be considered hypotheses about mental grammars that can be tested, e.g. by means of psycholinguistic experiments with nonsense words, and found psychologically *real* – or refuted. However, in this book I shall limit myself to exploring psychologically realistic analyses; no psycholinguistic experiments will be discussed.

In its mentalist orientation, cognitive linguistics differs from instrumentalist frameworks like Generalized Phrase Structure Grammar and Head-Driven Phrase Structure Grammar, where no connection between linguistics and cognition is assumed (Gazdar et al. 1985). However, this difference in orientation does not necessarily entail conflicting analyses of linguistic data. While cognitive linguistics emphasizes the relevance of cognition for the study of language,

cognitive linguists more than anything else aim at precise and testable analyses of linguistic data observed in language usage. The point is that the cognitive commitment helps the analyst to make sense of the data and thus develop more precise and insightful analyses.

The mentalist orientation unites cognitive linguistics and Chomskyan linguistics, but the hypotheses about the relationship between language and cognition are very different. Specifically, cognitive linguistics does not assume a language faculty that constitutes an autonomous module in the mind (Fodor 1983, Chomsky 1986; see Dąbrowska 2004, Feldman 2006 and Goldberg 2006 for critical discussion).[4] Furthermore, cognitive linguists do not share the assumption that phonology, syntax etc. form separate modules that are largely independent. According to cognitive linguistics, "[a]ll the various phenomena of language are interwoven with each other as well as all of cognition, because they are all motivated by the same force: the drive to make sense of our world" (Janda 2000: 4). Ironically, as pointed out by Taylor (2002: 79), this emphasis on meaning may have led to the relative neglect of phonology in cognitive linguistics. However, one of the aims of this book is to show how phenomena that have traditionally been classified as "abstract phonology" are recruited to convey meaning. In this way, the study of phonology has a lot to contribute to cognitive linguistics. Some of the advantages of a non-modular approach to grammar are discussed in chapter 10.

The analyses I present in this book are couched in Ronald W. Langacker's Cognitive Grammar (1987, 1991a, 1991b and 1999), one of the most influential frameworks within cognitive linguistics. I furthermore draw on the model of schema interaction discussed by Langacker's student Fumiko Kumashiro in her doctoral dissertation (Kumashiro 2000). Langacker (1991b and 1999) and Kumashiro (2000) refer to the framework as the "Usage-Based Model", and I have used this term in my earlier work (Nesset 2005 and 2006). For the purposes of this book, however, I will employ the term Cognitive Grammar in order to avoid confusion with other, slightly different versions of the Usage-Based Model (cf. Barlow and Kemmer 2000 and Bybee 2001). For more on the Usage-Based Model and other versions of cognitive linguistics, see section 2.7.

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4   It is interesting to notice the development in Chomsky's thinking about the language faculty. Hauser, Chomsky and Fitch (2002: 1569) hypothesize that recursion "is the only uniquely human component of the faculty of language". By thus scaling down the autonomous language faculty, Chomsky seems to adopt a position closer to cognitive linguistics. For critical discussion, see Goldberg (2006: 17).

2.2. The content requirement and category networks

An important principle in Cognitive Grammar is what Langacker calls the "content requirement":

(1)   The only structures permitted in the grammar of a language [...] are (1) phonological, semantic or symbolic structures that actually occur in linguistic expressions; (2) schemas for such structures; and (3) categorizing relationships involving the elements in (1) and (2). (Langacker 1987: 53–54)

What this really means is that grammars are networks of meaningful structures. The terms mentioned in the content requirement can be explained on the basis of the simple categorization network in Figure 2.1, which concerns the category of birds in Russian. The four boxes are schemas. They represent generalizations emerging from language use. Language users are likely to encounter numerous utterances involving the words for birds in Figure 2.1, and on the basis of such utterances language users may form schemas summarizing what the utterances of each word have in common.

The schemas involve form and/or meaning, or as Langacker puts it, phonological and semantic information. In the figure, the semantic information is given in small capitals in the upper part of each box. Notice that cognitive linguists use the term "semantics" in a very broad sense. It is assumed that meaning is embodied (Johnson 1987 and Lakoff and Johnson 1999), i.e. that it emerges from experience, and that the experience we have with our bodies is pivotal. Emphasizing the importance of experience, cognitive linguists argue that a boundary between linguistic and extra-linguistic knowledge is "largely artifactual" (Langacker 1987: 154, see also Geeraerts 1989 for discussion). In cognitive linguistics, therefore, "semantics" subsumes what many frameworks single out under the rubric "pragmatics".

The notion of "semantics" in cognitive linguistics is also broad insofar as it encompasses imagery, i.e. our ability to construe the same state of affairs in different ways, e.g. by considering it from different perspectives (Langacker 1987: 39). For instance, while the sentences *The lamp is over the table* and *The table is under the lamp* describe the same situation, the sentences have different meanings since the situations are viewed from different perspectives. Notice that the broad understanding of semantics in cognitive linguistics includes both lexical and grammatical meaning. Grammatical categories are not considered arbitrary indices, but rather meaningful structures, and even parts of speech are given semantic definitions (Langacker 1987: 183–274). Accordingly, the upper parts of the boxes in Figure 2.1 include the properties "noun" (N), "nominative"
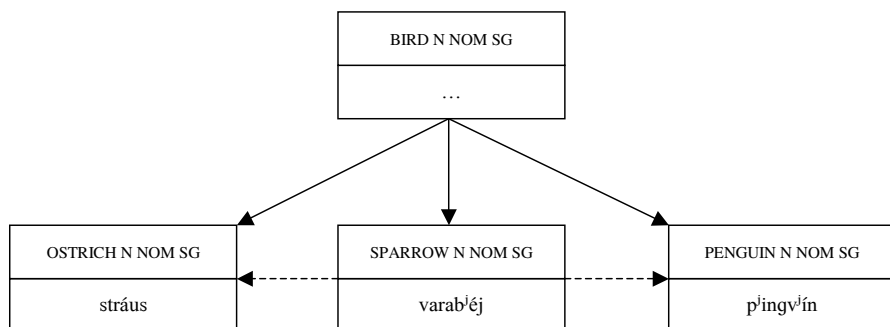
Figure 2.1. Categorization network

(NOM) and "singular" (SG) in addition to the lexical meanings represented as English glosses.

The lower parts of the boxes in Figure 2.1 indicate the pronunciation of the relevant words in a broad phonetic transcription. We shall return to the representation of sound in Cognitive Grammar in chapter 3. At this stage, I limit myself to pointing out that the phonological poles of the schemas are not intended as representations of sound directly, but rather are hypotheses about the conceptualization of sound in the mental grammar of the language users. Thus, in the same way as the meaning of, say, *vorobej* 'sparrow' is a concept, the sounds we use to signify this meaning, [varabʲéj], are concepts. We can imagine pronouncing and hearing the sounds without actually doing either (Langacker 1987: 78–79, see also Taylor 2002: 79–80 for discussion). In the same way as semantics, the term "phonology" is used in a broad sense in cognitive linguistics, insofar as it subsumes both "phonology" and "phonetics" in traditional terminology.

Schemas involving both form and meaning can be considered signs in the sense of Saussure ([1916] 1984), and are referred to as "symbolic". The schema for 'sparrow' is activated whenever this word is uttered, and in this sense it represents a generalization over symbolic structures actually occurring in linguistic expressions. It is important to notice that schemas do not exist independently of the structures they generalize over. In the words of Bybee (2001: 27), "schemas are organizational patterns in the lexicon and thus have no existence independent of the lexical units from which they emerge". In this sense, the model explored in this book is usage-based. Language use is primary, and generalizations are captured by means of schemas emerging from the structures actually occurring in utterances.

The schemas form a network; they are connected by means of categorizing relationships that are represented as arrows. Solid arrows stand for what Lan-

gacker (1987: 371) calls "instantiation". Relations of this type connect compatible schemas of different degrees of specificity. The arrow points at the more specific schema. For instance, in Figure 2.1 the schema for 'sparrow' is more specific than that of 'bird', since all sparrows are birds, while the converse is not true. There are no salient phonological properties that recur in all the names of the birds, and therefore the phonological pole of the schema for BIRD is empty as indicated by the suspension points. Thus, both with regard to meaning and form, the topmost schema in Figure 2.1 is more general than the three lower-level schemas. The dashed arrows represent the second type of categorization relation, "extension", which connects schemas that are similar although neither is an instantiation of the other (Langacker 1987: 371). In Figure 2.1, the dashed arrows are unidirectional since sparrows arguably are fairly prototypical birds, while ostriches and penguins are peripheral members of the category. In cases where no asymmetry of this type is felt, extension relations may be bidirectional.

The extension relations in Figure 2.1 connect symbolic schemas involving both meaning and form. This is tantamount to saying that the schemas for *pingvin* 'penguin' and *vorobej* 'sparrow' are partially compatible. If one wishes to specify that the two schemas resemble each other with regard to meaning, but not form, it is possible to draw a dashed arrow between the upper part of each schema, as shown in Figure 2.2. In this book, I will use the notation in Figure 2.1, which is sufficiently precise for the purposes of this study.
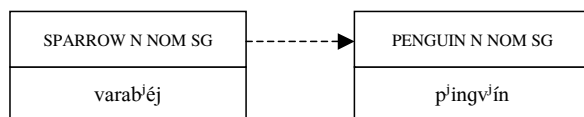
SPARROW N NOM SG	$\dashrightarrow$	PENGUIN N NOM SG
varab^{j}éj		p^{j}ingv^{j}ín

Figure 2.2.   Semantic connection

In chapter 1, I claimed that a cognitive linguistics approach to language is restrictive. The content requirement in (1) gives substance to this claim. The framework involves the parsimonious set of theoretical constructs sanctioned by the content requirement – and nothing else. These constructs all have cognitive motivation; schemas and categorizing relationships are not limited to linguistics, but represent aspects of cognition in general. In this book I shall analyze the interaction between phonology and morphology without adding any ad hoc machinery; the analysis will in its entirety be based on the "atoms" given in the content requirement. As we shall see, an approach along these lines has strong implications for the study of phonology and morphology; for instance, it precludes traditional notions like abstract underlying representations and procedural rules, which are incompatible with the content requirement.

2.3.   Schema interaction

The version of Cognitive Grammar I assume in this book models the alternative strategies a speaker may employ when activating schemas in categorization networks. Since the examples from Russian conjugation we shall consider later in this study are quite complex, I shall illustrate the model by means of a simpler example from a hypothetical language. Consider the situation in Figure 2.3 where a speaker wonders whether to attach the ending [a] or [u] to form the present tense of a verb with the stem [dab]. Accordingly, the model includes two alternatives given at the bottom of the figure: [dab+u] and [dab+a]. I shall refer to alternatives of this sort as "candidates" and represent them as rectangles with rounded corners. Langacker (1987 and 1991) uses rounded corners for elements that have not acquired status of conventionalized units in the grammar. The + sign represents the boundary between stem and ending.
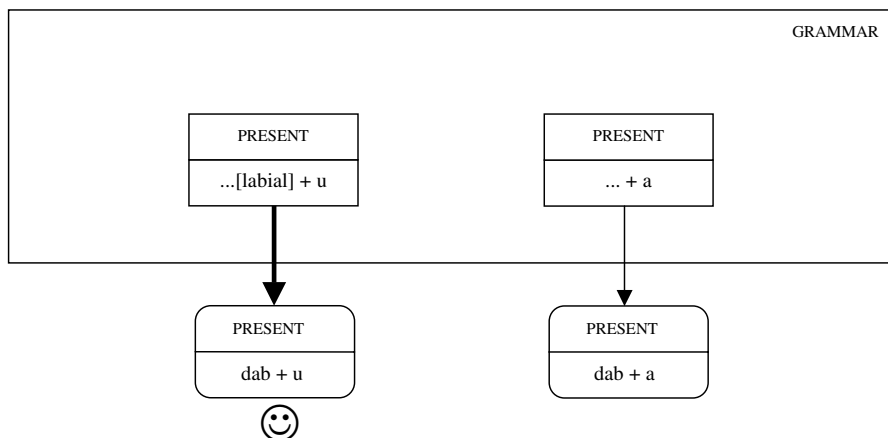

Figure 2.3.   Schema interaction

Candidates represent hypotheses that speakers and hearers can make about their native language. Since there is no inherent limit as to what hypotheses language users might want to consider, the candidate set is in principle infinite. It may contain structures that are at variance with the principles of the grammar, i.e. structures that are very different from anything they have encountered in language usage. Notice that this is not in conflict with the "content requirement" in (1), which emphasizes that "only structures that actually occur in linguistic expressions" are permitted in the grammar of a language. As shown in Figure 2.1, candidates are *outside* the grammar. Since the "content requirement" regulates the structures that are permitted in the grammar, it does not apply to the candidate set.

How does the language user know which candidate to select? S/he compares them to the categorization networks in his or her mental grammar. In the simple example in Figure 2.3, the grammar is represented as a rectangle containing two schemas. The schema to the left states that stems in labials combine with the ending [u], whereas the rightmost schema assigns the ending [a] without specifying the shape of the stem. Each candidate is compatible with one schema in the grammar, as indicated by the instantiation arrows. However, they comply with the schemas to different degrees. The candidate to the left instantiates the schema that includes the labial feature, whereas the candidate to the right complies with the less specific schema to the right, which does not contain a description of the shape of the stem. In the terminology of Langacker (1999: 106), the candidate to the left displays a higher degree of conceptual overlap.[5] This candidate is selected as the winner, as indicated by the smiling face placed underneath the candidate. For ease of reference, thick arrows represent a high degree of conceptual overlap.

In addition to conceptual overlap, frequency is relevant for the activation of schemas in the grammar. As Bybee (2001: 113) puts it, "each time an item is accessed, its memory representation is strengthened". Langacker (1987: 59) refers to memory strength as "entrenchment", and inspired by connectionism (e.g. McClelland and Elman 1986) he assumes that highly entrenched schemas are inherently easy to activate for language users (Langacker 1999: 105–106). While the principle of inherent ease of activation enables us to accommodate frequency effects in Cognitive Grammar, its interaction with the principle of conceptual overlap is anything but straightforward. What happens if a highly entrenched, but general schema competes with a less entrenched schema that involves a high degree of conceptual overlap? A priori, at least, situations of this sort may occur. In Nesset (2006: 1371–1372) I discuss an example from gender assignment, which suggests that conceptual overlap takes precedence over inherent ease of activation. However, this is hardly the whole story, and at present it seems fair to say that this is an open question that awaits further study in cognitive linguistics. For the purposes of this book, the winning candidate is selected on the basis of the principle of conceptual overlap.

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5   In his lucid discussion of schema competition, Taylor (2002: 302) uses the term "elaborative distance" instead of "conceptual overlap".