Cognitive Linguistics Research

Abstract Phonology in a Concrete Model

Cognitive Linguistics and the Morphology-Phonology Interface

Tore Nesset

MOUTON
DE GRUYTER

Abstract Phonology in a Concrete Model

Cognitive Linguistics Research
40

Mouton de Gruyter
Berlin · New York

Abstract Phonology in a Concrete Model

Cognitive Linguistics and the Morphology-Phonology Interface

by
Tore Nesset

Mouton de Gruyter
Berlin · New York

Mouton de Gruyter (formerly Mouton, The Hague)
is a Division of Walter de Gruyter GmbH & Co. KG, Berlin

∞ Printed on acid-free paper
which falls within
the guidelines of the ANSI
to ensure permanence and durability.

Library of Congress Cataloging-in-Publication Data

Nesset, Tore.
Abstract phonology in a concrete model : cognitive linguistics and the morphology-phonology interface / by Tore Nesset.
p. cm. − (Cognitive linguistics research ; 40)
Includes bibliographical references and index.
ISBN 978-3-11-020361-5 (hardcover : alk. paper)
1. Grammar, Comparative and general − Phonology. 2. Morphophonemics. 3. Cognitive grammar. 4. Russian language − Verb. I. Title.
P217.N47 2008
415−dc22

2008017571

Bibliographic information published by the Deutsche Nationalbibliothek

The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available in the Internet at http://dnb.d-nb.de.

ISBN 978-3-11-020361-5
ISSN 1861-4132

Printed in Germany

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.

I would like to thank my employer, the University of Tromsø, for granting me a sabbatical and the University of North Carolina for hosting me. Thanks to the Norwegian Research Council (Norges Forskningsråd) for financial support. Hans-Olav Enger and two anonymous reviewers read through earlier versions of the whole manuscript and provided detailed comments, which led to numerous improvements in form and content. Their assistance is gratefully acknowledged. I would like to thank series editors Dirk Geeraerts and John Taylor for helpful advice and Birgit Sievert at Mouton de Gruyter for fast and friendly response to all my questions. My heartfelt thanks go to Laura Janda for her input on all levels. Finally, I would like to thank Sara, Justina and Ludmila Janda for sharing mom with me.

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, ʐ, ʃʲ, tʃʲ, 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-

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

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

3 Dressler (1985:1) argues that "[a]ny conceivable definition of morphonology must be derivative: Whereas semantics, syntax, morphology, phonology can be defined within their own respective domains without referring to one another, a definition of morphonology 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.

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"

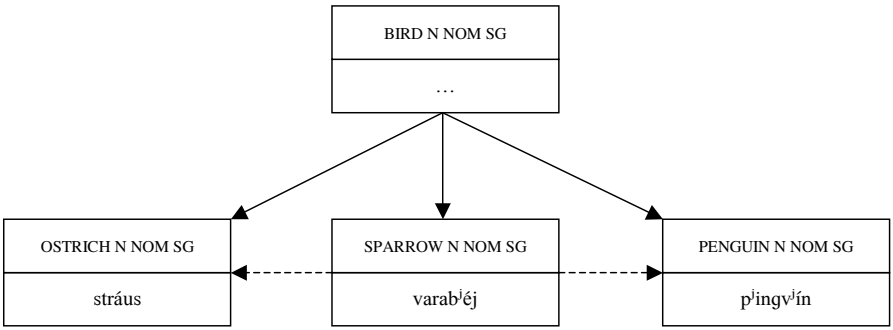

Figure 2.1. Categorization network

(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.

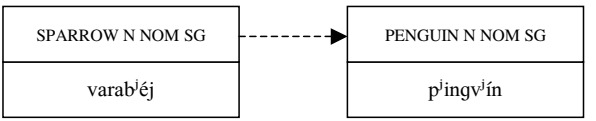

Figure 2.2. Semantic connection

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.

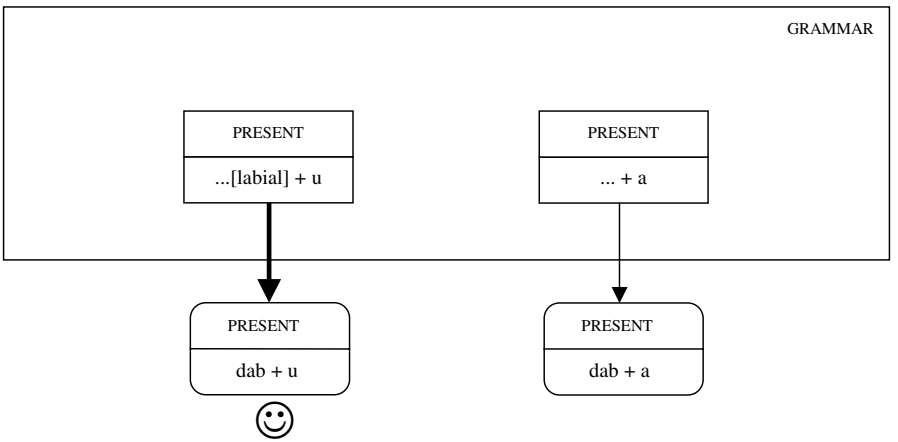

Figure 2.3. Schema interaction

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.

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

2.4. Schemas vs. rules and constraints

In the previous section we saw how Cognitive Grammar handles situations where a more specific schema takes precedence over a less specific schema. Situations of this type are well known in linguistics. In order to account for situations like this, generative linguists working in the rule-based models that were dominant in the 1970s and 1980s formulated a principle called the "Elsewhere Condition" (Kiparsky 1982), which ensures that specific rules take precedence over general rules.[6] In Cognitive Grammar, no such principle needs to be stated. As shown in Figure 2.3, the candidate associated with the more specific schema to the left is automatically preferred because it involves a higher degree of conceptual overlap. In other words, the Elsewhere Condition falls out as an automatic consequence of the architecture of Cognitive Grammar (Lakoff 1993a, Langacker 1999: 106). The point that the Elsewhere Condition is a special case of a more general cognitive principle was made by Lakoff (1987: 147), who refers to the principle as "Wilensky's law" in honor of the cognitive scientist Robert Wilensky. Wilensky formulated the principle "always apply the most specific pieces of knowledge available" in a book on planning (Wilensky 1983: 128), i.e. a work that had nothing to do with language or linguistics. We shall return to the relationship between the Elsewhere Condition and the principle of conceptual overlap in more detail in later chapters, especially chapter 7, which explores alternatives to rule ordering in Cognitive Grammar.

Emphasizing the role of conceptual overlap, the version of Cognitive Grammar I pursue in this book resembles other frameworks where the notion of "default" is central, e.g. Network Morphology (Corbett and Fraser 1993, Fraser and Corbett 1997). In Figure 2.3, the schema to the right is the default, in that it characterizes the normal pattern that applies unless more specific schemas like the one to the left are invoked. The schema interaction explored in this book boils down to the interplay between defaults and overrides. While I acknowledge the similarities between Cognitive Grammar and other frameworks, I would like to point out that there are differences too. The cognitive commitment, the view of meaning as embodied, the role of prototypes in categorization and the content requirement are properties of Cognitive Grammar and cognitive linguistics that set them apart from most other species in the garden of linguistic theories.

---

6 This principle is known by several names, e.g. "Proper Inclusion Precedence" (Koutsoudas et al. 1974) and "Maximal Subset Override" (Stump 1993). With the advent of Optimality Theory in the 1990s, rules were replaced by constraints, but the Elsewhere Condition survived, albeit under yet another name: "Panini's Theorem" (Prince and Smolensky 2004).

There are obvious similarities between Cognitive Grammar and Optimality Theory (Prince and Smolensky 2004). For instance, in both frameworks candidates are evaluated against grammars consisting of a set of well-formedness conditions (schemas in Cognitive Grammar, constraints in Optimality Theory). Moreover, both frameworks are based on parallel evaluation in that the candidates are evaluated against the entire grammar in one pass. It is not the case that you first compare the candidates to one component of the grammar, before you take the result of this evaluation to the next component and so on.[7] However, there are also important differences between schemas in cognitive linguistics and constraints in Optimality Theory:

(2) a. Schemas represent language-specific generalizations, whereas markedness constraints define typologically unmarked patterns across languages.
b. Schemas are always stated in positive terms, whereas markedness constraints may be negative statements (prohibitions).
c. Schemas generalize over surface forms, whereas faithfulness constraints refer to both surface and underlying representations.
d. The winning schema is selected on the basis of general principles of cognition, whereas constraints interact according to a language specific ranking hierarchy.

The constraints in Optimality Theory are of two types, "markedness" and "faithfulness". The schemas in Figure 2.3 resemble the former type. Notice, however, that markedness constraints describe typologically unmarked patterns. For instance, the No coda constraint ("syllables do not have codas") reflects the well-known observation from language typology that CV syllables are less marked than CVC syllables. Schemas, on the other hand, are language-specific generalizations based on structures attested in utterances.

As shown by the No coda constraint mentioned above, markedness constraints in Optimality Theory are often formulated negatively as prohibitions against unattested structures. Schemas cannot be stated negatively; they are generalizations about what occurs in utterances, so it is not possible to establish a schema for something that does *not* occur (Langacker 1999.120, see also discussion in Taylor 2002: 250–252). In other words, while Optimality Theory has

7 While most versions of Optimality Theory are parallelist, it should be noted that there are adherents of "Stratal Optimality Theory" (Kiparsky 2003, Bermudez-Otero forthcoming), where the candidates undergo several evaluations that are ordered sequentially. Sequential ordering is marginally possible in Cognitive Grammar by means of "computational chains" that can model certain types of feeding order relationships (cf. Langacker 1987: 442–445).

constraints that ban certain structures, cognitive linguistics models prototypes of what exists in a given language.

The third difference mentioned in (2) concerns faithfulness constraints in Optimality Theory, which describe correspondences between structures. In the next section, we shall see that similar correspondence relations can be represented in Cognitive Grammar as what I call "second-order schemas". However, Cognitive Grammar is more restrictive in that it only models relationships between surface forms ("output-output faithfulness"), while Optimality Theory also allows for relationships involving underlying representations ("input-output faithfulness").

The final difference in (2) concerns the interaction of schemas/constraints. In Optimality Theory, constraints are ranked in a largely language-particular way, whereas in Cognitive Grammar the winning candidate is selected on the basis of general principles of cognition, such as "conceptual overlap". Simplifying somewhat, one may say that Cognitive Grammar describes the interaction of language-specific schemas on the basis of universal principles of cognition, while Optimality Theory models the interaction of universal constraints with regard to a language-specific ranking hierarchy.

2.5. Second-order schemas: Source- vs. product-oriented generalizations

A notion that will play an important role in this book is the "second-order schema". In the hypothetical language we considered in section 2.3, we saw that speakers could establish schemas for present tense forms like [dabu]. Let us assume that this language has past tense forms ending in [i], e.g. [dabi], and that language users establish schemas stating that verb stems in labials combine with the ending [i] in the past tense. The schemas for the present and past tenses are given to the left in Figure 2.4. In section 2.2, we saw that schemas form category networks where each of them is connected via categorizing relationships. The two schemas to the left in Figure 2.4 are partially compatible, so speakers can connect them by means of an extension relation, as indicated in the rightmost portion of the figure. Language users can furthermore form schemas over the extension relations when they notice that the same relationships recur in the grammar. I represent this by including the schemas for the past and present as well as the extension relationship connecting them in a box. Although schemas of this sort have occasionally been proposed in the literature (cf. e.g. Langacker 1987: 442–445, Nesset 2005 and Tuggy 2005), no generally accepted term has been coined. In this book, I shall refer to schemas of this sort as "second-

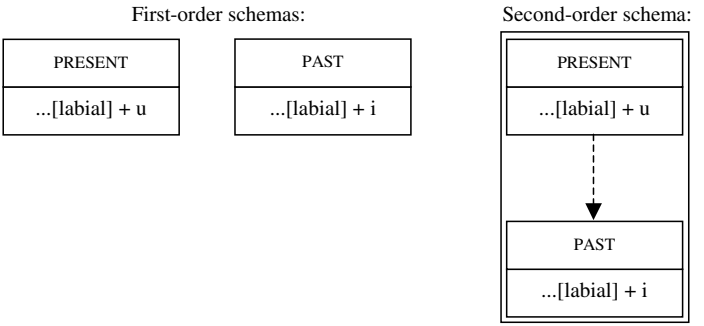

Figure 2.4. First-order and second-order schemas

order schemas" since they are schemas over schemas that are connected via categorizing relationships. The schema to the right in Figure 2.4 consists of the two schemas to the left as well as the extension relation connecting them. It is thus more complex than the two schemas to the left, for which I shall use the term "first-order schema". Notice that second-order schemas are not at variance with the content requirement cited in (1). Metaphorically speaking, such schemas are "molecules" consisting of the "atoms" mentioned in the content requirement; they do not contain structures that are not licensed by the content requirement.

In the second-order schema in Figure 2.4, the dashed arrow connects two symbolic schemas. Does this mean that the two schemas are partially compatible with regard to both form and meaning? As for form, both schemas contain a stem ending in a labial consonant, so the answer is clearly in the affirmative. It furthermore makes sense to say that the schemas are partially compatible in terms of meaning. Present and past tense are closely related categories involving the metaphorical location of events in time. In Figure 2.4, the schema for the past tense is depicted as an extension from the present tense. This is because the present tense arguably provides a natural starting point for an extension relation since the present tense includes the deictic center (the moment of speech). However, since we are dealing with a constructed example from a hypothetical language, there is obviously no further evidence to back up this analysis. It is likely that the relationships between present and past tense vary from language to language. Second-order schemas are capable of accounting for such variation. As mentioned in section 2.2, extension relations can be unidirectional and bidirectional and thus represent both asymmetric and symmetric relationships. In section 2.2, it was furthermore shown that extension relations can connect semantic, phonological or symbolic structures.

In this book, second-order schemas will be used for two purposes:

1) As in the hypothetical example we have just discussed, schemas of this type enable us to specify the relationships between morphological forms that belong to the same paradigm. In this way, second-order schemas allow us to describe the structure of inflectional paradigms, and are therefore useful tools in morphological analysis, as we shall see in section 4.2.

2) Second-order schemas are also useful in phonology, because they can capture generalizations about (morpho)phonological alternations, i.e. cases where a morpheme has different forms in different environments. We shall see examples of this in sections 3.4 and 3.9.

For now I will limit myself to pointing out one important implication of this approach. Since both alternations and paradigm structure can be analyzed as second-order schemas, it follows that they are special cases of the same, general cognitive phenomenon, viz. categorization by extensions from prototypes. The fact that cognitive linguistics and Cognitive Grammar are able to unify linguistic phenomena that on the face of it are very different testifies to their explanatory power. It also suggests that it is fruitful not to regard morphology and phonology as autonomous modules, but rather as aspects of cognition in general. Only in this way is it possible to tease out the general principles governing both morphological and phonological phenomena.

In order to clarify what second-order schemas really are, it may be useful to relate them to the terms "source-oriented" and "product-oriented" generalizations, mentioned in chapter 1. Source-oriented generalizations are pivotal in frameworks where surface representations are generated through the application of rules to underlying representations (e.g. Chomsky and Halle 1968). What you do in models of this type is to identify a class of underlying representations with specific properties and then change them to create the correct surface forms. In this way of thinking, the burden of explanation is on the underlying representation, which serves as a source for the creation of the surface forms. Therefore generalizations of this sort are known as "source-oriented" (Bybee and Slobin 1982, see also Croft and Cruse 2004: 300–302). Source-oriented generalizations are not limited to models with procedural rules. In Optimality Theory, source-oriented generalizations are captured by faithfulness constraints specifying correspondence relations between two structures.

Product-oriented generalizations specify the properties of some well-formed structure without relating it to any "source" on which it is purportedly based. First-order schemas capture product-oriented generalizations. The two examples in Figure 2.4, for example, capture generalizations about the shape of verb forms, but do not specify how they are related to anything else. Is it possible to express something equivalent to source-oriented generalizations in Cognitive

Grammar? Second-order schemas can do this job. The schema to the right in Figure 2.4, for instance, states that the past tense can be formed by replacing the ending [u] in the present tense by the past tense ending [i]. In other words, the present tense can be interpreted as a source in the formation of the past tense. However, once again I would like to highlight the restrictiveness of Cognitive Grammar. Since underlying representations are at variance with the content requirement, Cognitive Grammar does not represent source-oriented generalizations involving underlying representations. Second-order schemas express relations between schemas over structures that actually occur in utterances, i.e. surface forms in traditional terminology.

Summing up, in traditional approaches to phonology and morphology the emphasis has been on source-oriented generalizations, e.g. captured by procedural rules applying to underlying representations (e.g. Chomsky and Halle 1968). The focus in Cognitive Grammar is different. Here, product-oriented generalizations are primary in that they are expressed in first-order schemas. Source-oriented generalizations are captured in second-order schemas that are based on first-order schemas (expressing product-oriented generalizations).[8]

2.6. Parts and wholes: The integration relation

The relation between parts and wholes plays a fundamental part in human cognition. We think of carburetors as parts of car engines, and we think of engines as wholes consisting of various parts, e.g. carburetors. Part-whole relations are important in linguistics too, including phonology and morphology. In phonology, it is customary to say that (prosodic) words consist of syllables, which in turn are made up of segments. From a morphological perspective, words are analyzed into stems and inflectional affixes, and stems are analyzed into roots and derivational affixes. In Cognitive Grammar, parts and wholes are accounted for by means of what Langacker (1987: 75) calls "integration".

8 Emphasizing the primacy of product-oriented generalizations, Bybee (2001: 136) hypothesizes that all schemas in morphology are product-oriented. As Bybee (2001: 129) points out herself, "basic-derived relations" (which correspond closely to second-order schemas in the present study) appear to be counterexamples. However, Bybee speculates that even generalizations of this sort (which were considered source-oriented in Bybee and Slobin 1982: 285) can be captured in a product-oriented fashion if one assumes that the asymmetries between "basic" and "derived" forms can be reduced to differences in frequency. I will not pursue this hypothesis in this book.

In order to illustrate the properties of the integration relation, it may be useful to return to the hypothetical examples from the previous sections where a present tense form consists of a stem followed by the inflectional ending [u]. The situation is diagrammed in Figure 2.5, where the upper box represents the whole word and the lower boxes represent its parts (the stem and the ending). The relationships between the parts and the whole are given as solid lines connecting the boxes. Notice that the integration relation is represented differently from instantiation discussed in section 2.2. While the notation convention for integration is a solid line, instantiation is represented as a solid *arrow*.

Integration involves relations between each part and the whole, but the relations between the parts are also important. In a sense, it is the way the parts function together that constitutes the whole. A carburetor, for instance, is not much of a carburetor without the other parts of the engine, because without these parts it cannot function properly. In the hypothetical example in Figure 2.5, the dashed connection line represents a relation between the two parts. The connection line connects the ending with the suspension points in the dashed circle. The suspension points tell us that the stem-final labial is followed by something, and the correspondence line clarifies that this "something" is [u]. In this way, we account for asymmetric relationships between the parts whereby one part presupposes the existence of another part with a specific shape. We may refer to situations of this type as "syntagmatic selection". In the case at hand, it is the stem that selects a particular ending, but as we shall see in sections 5.1.2 and 5.3, endings may also select stems with a particular shape.

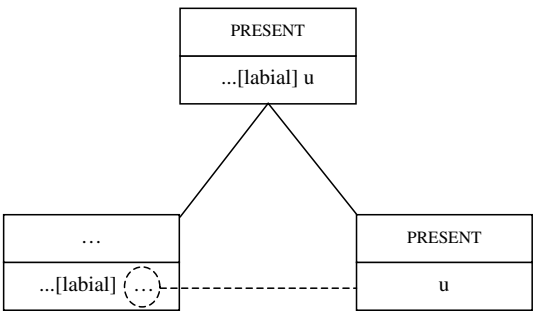

Figure 2.5. Integration

Langacker (1987: 304) refers to the encircled suspension points as an "elaboration site" ("e-site" for short), because [u] further specifies ("elaborates") what follows after the stem. Syntagmatic selection is a very common phenomenon in linguistics. A prototypical example from syntax is the valency relation between a predicate and its arguments. In morphology examples of the type depicted

in Figure 2.5 are widespread, and in phonology, it is often the case that a certain environment requires a certain allophone. In Cognitive Grammar the same basic notions – correspondence lines and elaboration sites – are used for all these cases, thus expressing that they are instances of the same cognitive phenomenon.

It is important to notice that the parts and the whole together constitute a schema. The focus on the properties of the parts does not by any means indicate that the upper portion of Figure 2.5 is superfluous. In many cases, the properties of the whole are not the sum of the parts' properties. Well-known examples are compounds like *blackbird*. Although it is clear that the meaning has something to do with the meanings of *black* and *bird*, these two concepts are not sufficient to characterize the meaning of the compound. Indeed, there are many black birds that are not blackbirds (e.g. ravens). As pointed out by Langacker (1987: 448ff), non-compositional examples like this are not problematic for Cognitive Grammar. The meaning of the compound can be accounted for in the upper part of figures like 2.4, while the meaning of the parts can be represented in the bottom part. In this way, the model clarifies the relationship between the meaning of the parts and the whole even in cases where the meaning of the whole is non-compositional.

In addition to accounting for syntagmatic selection, integration serves a more pedestrian, but nevertheless important purpose in this book. In order to capture generalizations in phonology and morphology, it is sometimes necessary to use terms like "stem-final", "root-final", "syllable-initial" etc. In other words, we need to refer to the boundaries between the constituent parts of a linguistic structure, and in order to do that we must identify these parts. As we have seen, this is the job of the integration relation. In traditional terms, the integration relation enables us to carry out segmentation. In the previous sections, I have marked morpheme boundaries in the schemas by means of the + sign. This notation is potentially misleading, insofar as it may suggest that + stands for a part of a phonological string in the same way as phonological segments like [u] do. This is not the case – in the schemas discussed above, the + sign represents the right edge of the stem and the left edge of the following ending. The format in Figure 2.5 avoids this potential source of confusion, while at the same time clarifying the cognitive status of segmentation as an example of the integration of parts and wholes. Despite the possibilities for confusion, in this book I will sometimes employ the simplified format as short-hand for the more precise format in Figure 2.5 in order to avoid unnecessarily complex figures.

Although the integration relation facilitates a principled account of segmentation, I hasten to add that Cognitive Grammar does not force us to assume

that all linguistic structures are exhaustively segmented into parts with clear-cut boundaries between them. As we saw in the case of *blackbird*, we do not have to ascribe all the properties of a whole to its parts. In Cognitive Grammar, the aim is not to reduce the properties of a whole to the properties of its parts, but rather to make explicit the relations between the parts and the whole. We return to segmentation and the integration relation in sections 4.4 and 6.3.

2.7. Other members of the cognitive linguistics family

At the beginning of this chapter, I described cognitive linguistics as a family of broadly compatible approaches that share a number of fundamental ideas about language and linguistics. Although this book focuses on Langacker's Cognitive Grammar, a few words about the other members of the family are in order.

2.7.1. The nature of categories: Prototype theory

The nature of categories is a primary concern in cognitive linguistics. Traditionally, categories have been defined by means of necessary and sufficient conditions. Such classical (Aristotelian) categories have clear-cut boundaries. If an element possesses the relevant set of necessary and sufficient conditions, this element is a member of the category; all other elements are not. Classical categories lack internal structure. Since all members share all the necessary and sufficient conditions, there is no difference between central and peripheral members of the category.

A different approach to categorization is sometimes referred to as "Prototype Theory" (cf. e.g. Geeraerts 1989). Instead of necessary and sufficient criteria, membership of a category is defined in terms of an element's similarity to a central subcategory or member – the prototype. Inspired by the findings of Eleanor Rosch and her associates in psychology (cf. e.g. Rosch 1978), cognitive linguists started exploring the relevance of prototypes for linguistic categorization in the 1980s (cf. Geeraerts 1989 and Taylor 2003). In his influential monograph *Women, Fire, and Dangerous Things* (1987), George Lakoff argued that radial categories structured around prototypes are pervasive in language and cognition, and Prototype Theory soon became one of the cornerstones of cognitive linguistics. Prototype Theory has proved relevant for all fields of linguistics. Important early applications to morphology and phonology include Bybee and Moder (1983) and Nathan (1986, 1989).

Langacker's (1987: 369–408) network model of categorization presented in section 2.1 accounts for prototype-based categorization by means of extension relations holding between prototypes and peripheral category members. Although my book does not focus on theoretical discussion of prototypicality, extension relations are pivotal in the analyses I propose, insofar as one of the key concepts in this book, second-order schemas, presupposes extension relations. As shown in section 2.5, second-order schemas consist of schemas connected by extension relations.

2.7.2. Language structure and language use: The usage-based model

On a traditional view, a generative grammar consists of a set of general rules, which when applied to the lexical items stored in the lexicon enables us to generate all and only the well-formed structures in the language. Speakers arrive at their grammars from a universal grammar shared by all humans through the setting of parameters. While such a characterization of generative grammar is simplistic, it is sufficiently precise to show that language use plays a minor role; from the perspective of generative grammar one would not expect language use to have much of an impact on the structure of the grammar. Nevertheless, there is strong evidence that it does. A case in point is the English verb. Bybee and Slobin (1982) demonstrated that there is a strong correlation between irregularity and high frequency. The verbs that retain irregular inflection have high frequency, while verbs that are used less frequently tend to be regularized.

Taking evidence such as this seriously, linguists and cognitive scientists have developed frameworks that account for the intimate relationship between language structure and language use. Such frameworks are often known under the common denominator "the Usage-Based Model". In this model, a grammar is viewed as an interactive activation network of the type postulated by e.g. Elman and McClelland (1984). The nodes in the network are schemas which are more or less entrenched depending on how often they are activated.

Numerous important contributions to cognitive linguistics have been couched in the Usage-Based Model (cf. e.g. Barlow and Kemmer 2000, Bybee 2001 and Tomasello 2003). Although there are differences in terminology and empirical focus, all these frameworks are largely compatible with Langackerian Cognitive Grammar. Indeed, as mentioned in section 2.1, Langacker (1991b, 1999) refers to his own framework as a usage-based model. The category networks of Cognitive Grammar are essentially interactive activation networks, and the content requirement cited in section 2.2 guarantees that only structures attested in actual utterances are included in the grammar. In this way, the gram-

mar emerges from language use. This "bottom up" organization of the grammar differs from the "top down" structure of generative grammars where surface representations are generated from underlying representations.

2.7.3. Grammatical constructions: Construction grammar

A number of approaches to syntax in cognitive linguistics are known under the heading "construction grammars" (e.g. Fillmore 1999, Goldberg 1995, 2006 and Croft 2001). Constructions like the ditransitive construction are well known in linguistics, but they are traditionally not given any theoretical status in generative grammar. The fact that there are two objects in sentences like *Annie gave her teacher an apple* is not related to a ditransitive construction, but rather seen as a projection of the lexical properties of verbs like *give*, which subcategorize for two objects. However, sentences like Goldberg's (1995: 9) celebrated example *He sneezed the napkin off the table* suggest that this cannot be the whole story (see also Goldberg 2006: 6f). There is nothing in the meaning of the intransitive verb *sneeze* that makes us expect the arguments in the sentence. Instead of concluding that generative grammar should be supplemented with a theory of grammatical constructions, adherents of construction grammars adopt a more radical position according to which constructions are the basic unit of syntax. On this view, grammars are networks of symbolic units – constructions – that are connected by means of categorizing relationships. This approach probably looks familiar to the readers of the present book, since the framework I have outlined in this chapter is all about category networks and categorizing relationships. Indeed, as pointed out by Croft and Cruse (2004: 278–283), Cognitive Grammar can be regarded as a construction grammar, although the term "construction" does not figure prominently in Langacker's *Foundations of Cognitive Grammar* (1987 and 1991a).[9] While construction grammars have mainly been concerned with syntax, the arguments for constructions are in fact even stronger in morphology, since the combination of morphemes into words involve more idiosyncrasies than syntactic structure (cf. Croft and Cruse 2004: 254, Booij 2005). It may also be fruitful to analyze (morpho)phonological patterns in terms of constructions (Välimaa-Blum 2005). In this book, I will not employ the terminology and formalisms of construction grammars, but it is important to notice that my analyses are compatible with the basic tenets of these approaches.

---

9 For a recent comparison of Cognitive Grammar and Construction Grammar, see Goldberg (2006: 220–225).

2.7.4. Mappings across domains: Metaphors and conceptual integration

In their seminal monograph *Metaphors We Live By* (1980), Lakoff and Johnson argued vigorously that metaphors are much more than rhetorical devices – metaphors structure language and thought. For instance, the metaphor ARGUMENT IS WAR governs the way we think and talk about argument, and influences our actions when we argue with someone. Metaphors in the relevant sense are mappings across domains (Lakoff 1993b: 203), and such mappings are relevant for grammatical analysis.[10] A case in point is the metaphor TIME IS SPACE (cf. e.g. Lakoff 1993b: 216 and Haspelmath 1997: 1), according to which temporal expressions are metaphorical extensions from spatial meanings (cf. e.g. the analysis of the use of Russian prepositions that express time in Nesset 2004). Janda (2004) has shown that the category of aspect in Russian can be analyzed in terms of spatial metaphor.

Metaphors like ARGUMENT IS WAR and TIME IS SPACE represent mappings between two domains. A theoretical framework that accommodates mappings between more than two domains is known as Conceptual Integration or Conceptual Blending. Fauconnier and Turner (2002) propose a network model with four or more interrelated mental spaces. By way of illustration, consider the example (discussed at length in Fauconnier and Turner 2002: 18–21), where someone suggests that what the USA needs is Margaret Thatcher as its president. A possible response is that she would never be elected in the USA, because the trade unions cannot stand her. Thinking about this involves juxtaposing two domains (mental spaces): one concerning Margaret Thatcher and one concerning American politics. On Fauconnier and Turner's analysis, speakers blend elements from these two input spaces in a third space, the blended space, where Margaret Thatcher is running for president in the USA. In addition, there is a fourth space involved, the generic space, which captures the structure that is shared by the two input spaces.

Conceptual Integration has proved applicable to a wide variety of problems in cognitive science – including linguistic analysis. In syntax, examples like *He sneezed the napkin off the table* can be analyzed as the integration of the English caused motion construction with a complex situation where someone sneezes and a napkin flies off a table (cf. Coulson and Oakley 2000: 190–191 for discussion). Although Conceptual Integration will not be pursued in this book, it is important to point out that it is not at variance with Cognitive Grammar and that Conceptual Integration has interesting implications for morphological and

10 Metaphor as cross-domain mapping is often contrasted with metonymy, which is understood as a relation within a domain (Kövecses 2002: 145). For recent discussion of metonymy, see Peirsman and Geeraerts (2006a and b) and Croft (2006).

phonological analysis.[11] In morphology, Mandelblit (2000) proposes an analysis of the Hebrew verbal system in terms of Conceptual Integration. A possible case for Conceptual Integration in phonology is complex segments such as affricates, which blend properties of plosives and fricatives.

2.8. Conclusion: A cognitive linguist's toolbox

In this chapter, I have compared Cognitive Grammar to frameworks inside and outside the cognitive linguistics family. More importantly, however, we now have a toolbox containing a small set of notions that are all based on general principles of cognition. Here are the key concepts with short explanations and information about how they are represented in figures:

(3) a. **Schema:** A node in a category network, capturing a generalization about the meaning and/or form of structures occurring in utterances. Schemas are represented as rectangular boxes.
b. **First-order schema:** A "regular" schema that does not contain other schemas. First-order schemas capture product-oriented generalizations.
c. **Second-order schema:** A schema consisting of two or more schemas and the categorizing relationships that connect them. Second-order schemas capture source-oriented generalizations.
d. **Categorizing relationship:** A comparison of two structures, which are partially or fully compatible with each other.
e. **Extension:** A categorizing relationship specifying that two structures are partially compatible. Extension relations are represented as dashed arrows.
f. **Instantiation:** A categorizing relationship specifying that two structures are fully compatible, but one is more specific than the other. Instantiation relations are represented as solid arrows.

11 A potential source of terminological confusion is Langacker's integration relation discussed in section 2.6 and Fauconnier and Turner's Conceptual Integration framework. The two uses of "integration" are related, but not identical. While Fauconnier and Turner are concerned with mappings across mental spaces in general, Langacker's use of "integration" is limited to the relationship between parts and wholes. To be sure, part-whole relations can be analyzed in terms of Conceptual Integration, and such an approach is likely to be very fruitful, especially in the numerous cases where the meaning of the whole does not follow from the meaning of the parts.

g. **Candidate:** A hypothetical structure that may or may not comply with the schemas in the grammar. Candidates are represented as boxes with rounded corners.
h. **Conceptual overlap:** The degree to which a candidate complies with a schema in the grammar. Conceptual overlap is instrumental in the selection of the winning candidate. The degree of conceptual overlap corresponds to the thickness of the instantiation arrow connecting the schema and the candidate.
i. **Integration:** The relationship between a whole and the parts it consists of. Integration relations are represented as solid lines (without arrowheads).

In the following two chapters, we shall see that these tools facilitate principled analyses of a wide range of phenomena in phonology and morphology.

Chapter 3
A cognitive approach to phonology

In this chapter, I show how some key concepts in phonology can be handled in Cognitive Grammar and in cognitive linguistics in general. As we shall see, the general notions explored in chapter 2 are sufficient for this purpose. No ad hoc machinery is required in a cognitive approach to phonology.

My aims in this chapter are practical; the focus is not on theoretical discussion at a foundational level. My primary concern is to show how the tools developed in chapter 2 can be employed in analysis of the phonological phenomena relevant for stem alternations in Russian verbs, including phonemes and allophones (section 3.1), phoneme systems (3.2), phonological features (3.3), schemas vs. rules (3.4–3.5), phonological opacity (3.6) and neutralization in (de)voicing, palatalization and vowel reduction (3.7–3.9). Hopefully these analytical tools will prove useful for other linguists interested in similar phenomena in other languages.

Although all the data in this chapter are from Russian, the reader should be warned that s/he is not being presented with a complete analysis of Russian phonology. However, the discussion is detailed enough to introduce the phonological facts relevant for the analysis of the verbal stems in this book.

3.1. Phonemes and allophones

The distinction between phonemes and allophones (contrastive and non-contrastive segments) is of fundamental importance for phonological analysis. While sounds can differ along a large number of parameters, not all differences are equally important. Some properties of a sound serve to distinguish between meanings, while others do not. How can this be accounted for in Cognitive Grammar?

When language users are exposed to utterances, they can establish schemas generalizing over the sounds they hear or pronounce. The simple example in Figure 3.1 involves five Russian words with stressed, low vowels in various environments, and schemas based on these words. For convenience, I state the schemas as strings of segments, although the very notion of "segment" is an idealization. Cognitive Grammar is compatible with more precise representations of speech, e.g. in terms of gestures (Browman and Goldstein 1991), but strings of segments are sufficiently precise for the purposes of this book. The

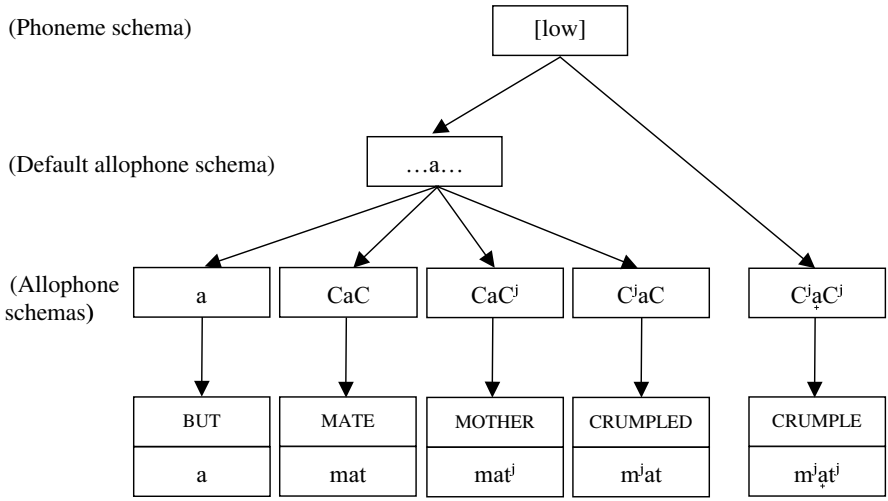

Figure 3.1. The Russian /a/ phoneme as a category network

figure shows that a somewhat fronted vowel (represented as [ạ]) occurs between two palatalized consonants (for convenience given as C^{j}), while the more back vowel [a] is attested elsewhere. This is a simplified account of the facts, but the data suffice to show that [ạ] and [a] are in complementary distribution.[12] Since they always occur in different environments, they cannot form minimal pairs and cannot distinguish between meanings. They are non-contrastive segments (allophones).

Language users can form a more inclusive schema generalizing over all the schemas with the non-fronted [a]. Since this allophone occurs in all environments except between palatalized consonants, it represents the default allophone and no particular context can be specified. The schema therefore only contains the vowel preceded and followed by suspension points. On a higher level of generality, language users may form a schema for both allophones in order to capture that they are both low vowels. Since low vowels occur in any environment, they can form minimal pairs with mid and high vowels. Compare the string [tam] (with a low vowel) to [tom], which contains the mid vowel [o], but the same consonants as [tam]. Since [tam] means 'there' and [tom] means

12 Many researchers also assume some degree of fronting when only one of the flanking consonants is palatalized (see Timberlake 2004: 32–40 for a thorough discussion of the facts and an overview of different analyses). Fronting also occurs when the vowel is flanked by two palatal consonants. We return to the distinction between palatal and palatalized consonants in sections 3.2 and 3.3.

'volume', the vowels distinguish between two meanings. In other words, we are dealing with phonemes or contrastive segments.[13]

Figure 3.1 shows how phonemes (contrastive segments) and allophones (non-contrastive segments) can be accounted for in Cognitive Grammar by means of category networks containing schemas of various levels of generality. In this book, phonemes will be represented as context-free schemas, i.e. schemas for the default allophone or the entire category, while schemas specifying a certain context will be used for allophones. However, it is important to bear in mind that the schemas represent *categories* of related sounds of the type illustrated in Figure 3.1 (Langacker 1987: 388–394). In this way, as pointed out by Taylor (2003: 248), cognitive linguistics embraces Daniel Jones' (1931: 74) famous definition of a phoneme as a "family of related sounds" (see also Nathan 1986: 216 and Bybee 2001: 53). However, at the same time the context-free schemas representing such families accommodate the structuralist idea of phonemes as contrastive segments serving to distinguish between meanings. Since category networks are hypotheses about aspects of native speakers' mental grammars, cognitive linguistics is in line with the view of the phoneme as a psychological entity. As shown by Anderson (1985: 80–81), this approach can be traced back to the Kazan' school of phonology (cf. Baudouin de Courtenay [1895] 1972: 152), and it was taken over by Baudouin de Courtenay's student L.V. Ščerba ([1912] 1983: 14), the founder of the Petersburg/Leningrad school of phonology in Russia. In North America, Sapir (1921: 56–57) is an important early proponent of the mentalist approach to the phoneme. The following definition accommodates the phonetic similarity (which may be acoustic and/or pertain to articulation), as well as the contrastive and mentalist aspects of the notion:

(1) Phonemes are conceptual categories consisting of phonetically similar sounds that serve the same distinctive function.

Similar, but not identical definitions are given in Mompeán-González (2004: 430) and Välimaa-Blum (2005: 57).

Summarizing, the network model of categories brings together various approaches to the phoneme, and clarifies the phoneme-allophone distinction. The difference between context-free and context-specific schemas will play a key role in the analysis of softening in sections 9.3 and 10.5.

13 In order to avoid unnecessary complications, I do not include labialization of consonants in the transcription of the examples. Russian non-palatalized consonants are labialized before rounded vowels, but labialization is not contrastive (cf. Jones and Ward 1969: 79 and Matusevič 1976: 125–127).

3.2. Phoneme systems

In the spirit of the analysis developed above, a phoneme system is the collection of all phoneme categories in a language, organized so as to group similar categories together. However, instead of including a whole network for each phoneme, it is often more efficient to represent them as the schemas for the default allophones. Table 3.1 gives the vowel system of Contemporary Standard Russian, which has five contrastive vowels.[14]

Table 3.1. Vowel phonemes in Contemporary Standard Russian

	Unrounded:	Rounded:
High:	i	u
Mid:	e	o
Low:	a	

The system of contrastive consonants in Contemporary Standard Russian is given in Table 3.2.[15] Russian consonants differ along three axes: manner of articulation, voicing and place of articulation. In the table, the vertical axis reflects the two first parameters, while place of articulation occupies the horizontal axis. It is customary in Russian phonology to distinguish between "soft" and "hard" consonants. Phonetically speaking, the soft consonants are of two types. The first type comprises palatalized segments, i.e. segments with a palatal secondary place of articulation. In the table (and elsewhere in this book) palatalized segments have a superscript ^{j}. The second type of soft segments involves palatal segments like /j/, which have a palatal primary place of articulation. "Hard" is used as a cover term for the consonants that are neither palatalized nor palatal. In phonetic terms, hard consonants come in three types: velar, velarized and "plain". The velar type comprises /k, g, x/, which have a velar primary place of articulation. Velarized consonants have a velar secondary place of articulation,

14 Some researchers, notably supporters of the Petersburg/Leningrad school, assume a sixth vowel phoneme /ɨ/ (cf. e.g. Ščerba [1912] 1983: 50). However, this analysis will not be adopted in this book as it fails to capture the generalization that [ɨ] and [i] are in complementary distribution in that the former occurs after non-palatalized consonants, and the latter elsewhere. For detailed discussions of this issue, the reader is referred to Panov (1967: 58–60) and Timberlake (2004: 40–41).

15 Most of the terms used in the table do not require comments. Notice, however, that I employ the term "alveolar" rather than "dental", and that I characterize the "hushing" consonants /ʂ, ʐ, tʃʲ, ʃʲː, ʒʲː/ as post-alveolar (Catford 1977, Laver 1994), since they are articulated in the back part of the alveolar ridge. The term "dorsal" is used as a cover term for palatal and velar sounds.

Table 3.2. Consonant phonemes in Contemporary Standard Russian

			Labial		Alveolar		Post-alveolar		Dorsal
			C	C^{j}	C	C^{j}	C	C^{j}	
Obstruent	plosive	voiceless	p	p^{j}	t	t^{j}			k
		voiced	b	b^{j}	d	d^{j}			g
	affricate	voiceless			ts			tʃ^{j}	x
	fricative	voiceless	f	f^{j}	s	s^{j}	ʂ	ʃ^{j}:	
		voiced	v	v^{j}	z	z^{j}	ʐ	ʒ^{j}:	
Sonorant	nasal	voiced	m	m^{j}	n	n^{j}			
	lateral	voiced			l^{ɣ}	l^{j}			
	vibrant	voiced			r	r^{j}			
	glide	voiced							j

indicated by a superscript ^{ɣ}. Although it is not controversial that Russian has velarization, its exact distribution is contested. For the purposes of this study I follow Ladefoged and Maddieson (1996: 361) who consider velarization relevant for laterals only. The only velarized segment in Table 3.2 is therefore /l^{ɣ}/. The labial, alveolar and post-alveolar consonants with no superscript are hard consonants of the "plain" type, which do not have a secondary place of articulation.

The only palatal consonant in Table 3.2 is /j/, but Russian also has the palatal obstruents [c, ɟ, ç]. Are they allophones of /k, g, x/ or separate phonemes? This is a long-standing issue in Russian phonology. Traditionally, palatal and velar obstruents have been in complementary distribution in standard Russian, in that the palatals occur before /i, e, j/, while velars are found elsewhere. However, due to loanwords and some productive suffixes there are examples of palatals before back vowels in Contemporary Standard Russian. Examples with borrowings include *kjuvet* 'ditch' and *gjaur* 'giaour'. Relevant suffixes are *-or* and *-onok* with examples like *kiosker* 'stall-holder', *paniker* 'panic-monger' and *makakenok* 'offspring of macaque' (Flier 1982: 142).[16] As pointed out by Timberlake (2004: 60), examples like these suggest that the Russian standard language of today is in the process of developing palatal obstruent phonemes. We shall see that this diachronic process (which is more advanced in some dialects) is of relevance for the analysis of softening in section 10.5. The palatal obstruents are not included in Table 3.2, which reflects the somewhat archaic variety where [c, ɟ, ç] are allophones of /k, g, x/.

16 The example *makakenok* is not accepted by all native speakers, but it is attested on the internet (google search performed in August 2007).

A detailed discussion of each phoneme is not necessary for our purposes, but let me point out that some researchers do not include /ʃʲ:, ʒʲ:/ in the phoneme system, but analyze them as sequences of two segments, because they have longer duration than other Russian consonants and are rare morpheme-internally (Halle 1959, Isačenko 1969, see also Timberlake 2004: 65–67 for critical discussion). Which analysis one adopts is not important for our purposes, but the duration facts will prove relevant in the analysis of the transitive softening alternation in section 9.2.

3.3. Features and feature geometry

In order to generalize over groups of segments, we need phonological features. In cognitive linguistics, phonological features do not enjoy a special, theoretical status; they are simply schemas over segment classes. Figure 3.2 illustrates this for the Russian contrastive vowels, where the schemas [high], [mid], [low], [rounded] and [unrounded] define subsets of the five phonemes. The conception of features as schemas is restrictive and flexible at the same time. The restrictions are rooted in the content requirement discussed in section 2.2. Schemas are generalizations over structures occurring in utterances, so if features are schemas it follows that they are grounded in phonetics. Another important restriction is that features cannot be negatively specified. Since the absence of something does not occur in utterances, the absence of something cannot be part of a schema either if we take the content requirement seriously. In this book, therefore, I do not use binary features with a positive value for a property and a negative value for the absence of this property. Instead, features are "unary" specifications of some property occurring in utterances. Admittedly, I use the feature specification [unrounded] in Figure 3.2, and later on in this book, I shall employ the feature [voiceless]. However, although these features are opposed to [rounded] and [voiced] they can be defined in positive terms. Rather than indicating the absence of rounding, [unrounded] serves as a mnemonic for spread and neutral lip positions, where the commissures of the lips are relatively far apart. A similar point can be made for [voiceless]: this feature involves an open glottis facilitating a free air stream through the larynx that is characteristic of the voiceless consonants in Russian.[17]

17 Let me briefly point out that there is another alternative to negative feature specifications, viz. underspecification. Instead of characterizing /i, e, a/ as [–rounded], one may simply say that these vowels lack a specification for lip position altogether. As underspecification has a long tradition in phonological theory, it may be worth mentioning that it is compatible with the content requirement, because it simply means

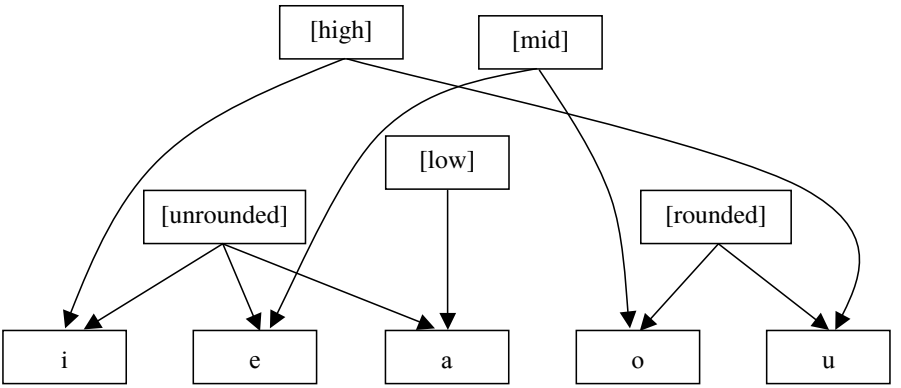

Figure 3.2. Features as schemas for Russian vowel phonemes

The conception of features as schemas is flexible in that it does not preclude redundancy. There is evidence that speakers store detailed phonetic information in their mental lexicons, even if this information is predictable.[18] Although the feature schemas in Figure 3.2 are sufficient to distinguish between the five vowel phonemes in Russian, there is nothing in the theory that would prevent the linguist (or the language user) from adding schemas. A schema [front] would, for instance, cover the default allophones of /i, e/. In section 10.2, we shall see that this schema proves useful in the analysis of the softening alternation.

Viewing features as schemas also yields a flexible approach insofar as it allows for features that generalize over other features. For instance, in the analysis of the softening alternation we need a feature [lingual] generalizing over alveolar, post-alveolar and dorsal (but not labial) consonants (cf. section 9.2). The major class features [obstruent] and [sonorant] are of this sort; the former generalizes over plosives, affricates and fricatives, while the latter covers the

that the language users do not form a schema for a certain class of items, e.g. /i, e, a/. Whether one adopts a positively specified schema or assumes underspecification is an empirical question. If there is at least one phenomenon in the language where /i, e, a/ behave like a class, this would suggest that the speakers form a (positively specified) schema for the class. If not, the underspecification analysis may be preferable. However, since the phenomena explored in this book do not bear on this question, it will not be pursued in the following.

18 For discussions of the evidence in favor of redundancy, the reader is referred to Bybee (2000 and 2001: 40–49), Dąbrowska (2004: 18–22), Välimaa-Blum 2005: 649 and references therein.

remaining Russian segments.[19] Major class features fall out as a natural consequence of the network model. In this model, schemas generalizing over more specific schemas is an expected and natural state of affairs.

The features employed in this book are based on articulatory phonetics. However, cognitive linguistics is flexible. Language users may form generalizations over articulatory and acoustic properties of sounds, and accordingly schemas may be of both types.

Do segments have internal structure? Traditionally, segments have been viewed as unordered feature bundles, but adherents of "feature geometry" represent features by means of tree diagrams with internal structure (cf. Clements and Hume 1995). With regard to this issue, the cognitive linguist may remain agnostic. There is nothing in cognitive linguistics that would preclude some version of feature geometry, but at the same time there is nothing in the theory that would require it either. In this book, unordered feature bundles are sufficiently precise in most cases, but in the case of place of articulation a simple geometrical representation is helpful. Recall from section 3.2 that Russian has palatalized and velarized segments, i.e. segments which combine a labial, alveolar or postalveolar primary place of articulation with a palatal or velar secondary place of articulation. The exact distribution of velarization is somewhat controversial, but it seems clear that at least the non-palatalized lateral is velarized (Ladefoged and Maddieson 1996: 361). In order to account for palatalization and velarization, I propose that segments have a place node that dominates nodes for the primary and secondary places. This enables us to characterize the five types of segments given in the lower portion of Figure 3.3. (In the figure, I illustrate "plain" and palatalized consonants by means of sounds with an alveolar primary place of articulation. Notice, however, that Russian also has labial and

19 In the case of /v, v^{j}/, it is difficult to draw the boundary between obstruents and sonorants. Like obstruents, /v, v^{j}/ are subject to devoicing before voiceless obstruents and in word-final position. Therefore, the diminutive *travka* and the genitive plural *trav* of *trava* 'grass' are pronounced with [f]. However, like sonorants they do not condition voicing of a preceding obstruent, as testified by the minimal pairs /dvoíx/ 'two (genitive)' ~ /tvoíx/ 'your (genitive plural)' and /dv^{j}er^{j}/ 'door' ~ /tv^{j}er^{j}/ 'Tver (name of city)'. For in-depth discussion of this long-standing issue in Russian phonology, the reader is referred to Jakobson (1956/1971), Andersen (1969a), Shapiro (1993), Kavitskaya (1999), Lulich (2004), Petrova and Szentgyörgyi (2004), Timberlake (2004: 71–74) and references therein. For the purposes of the present study, it is sufficient to note that verbs with stem-final /v/ behave like sonorant-final verbs with regard to the truncation alternation. An example is *žit'* 'live' which lacks the stem-final consonant in the past tense and the infinitive, as shown in /ʐi̯+l/ 'he lived', but not in the present tense and the imperative (cf. /ʐi̯v+ú/ 'I live'). Other examples of verbs with stem-final /v/ are *plyt'* 'swim' and *slyt'* 'pass for'.

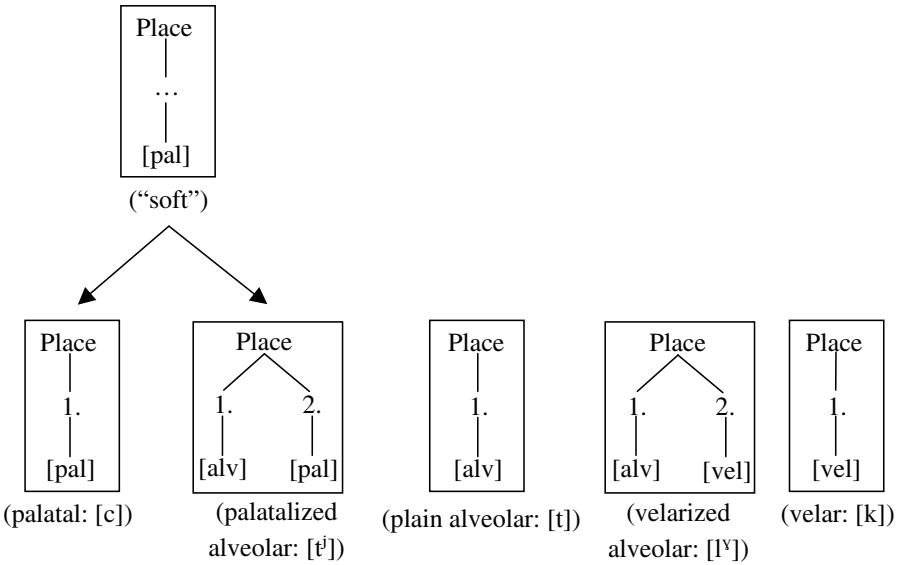

Figure 3.3. Feature geometry for soft and hard consonants in Russian

post-alveolar consonants of these types, as shown in the phoneme system in Table 3.2 above.)

As mentioned in section 3.2, in Russian linguistics it is customary to group palatalized and palatal segments as "soft", and the rest as "hard". This usage will be adopted in this book, but I shall also use the more transparent and precise terms "palatal(ized)" about the soft and "non-palatal(ized)" about the hard consonants. The feature geometry in Figure 3.3 enables us to represent the soft consonants as a schema given in the upper portion of the figure. In this schema, the feature [palatal] represents the fact that all soft segments have a palatal place of articulation. The suspension points between the feature and the place node tell us that it can be either primary or secondary. The hard segments are those that do not involve a palatal primary or secondary place of articulation. As there is no feature constellation that unites all hard segments, it is not possible to form a schema for this category as a whole. In a sense, therefore, "hard" consonants are "unmarked", while "soft" consonants are "marked" – a characterization of the situation that many Slavists will recognize.

3.4. Abstractness: Schemas instead of rules

In serialist approaches to phonology, regularities are captured by means of rules that specify procedures applying to underlying representations. Rules of this sort are not part of the cognitive linguist's toolbox. As specified in the content requirement in section 2.2, all we have at our disposal is schemas and categorizing relationships. The question, therefore, is whether these tools are sufficient to account for regularities in phonology. It is helpful to consider a concrete example. In section 3.1 above we saw that the phoneme /a/ has a fronted allophone when flanked by palatal(ized) consonants. The same is true for all Russian vowel phonemes as can be seen from Table 3.3.[20] In a rule-based model, these facts can be accounted for in terms of a procedure that replaces the underlying vowel by a fronted vowel between two palatal(ized) consonants. If we let a + sign under a capital V represent a fronted vowel and C^j the palatal(ized) consonants, we can write the rule informally as follows:

(2) /V/ → [V̟] / C^j ___ C^j ("Front a vowel when flanked by palatal(ized) consonants.")

Table 3.3. Fronting between palatal(ized) consonants

Phoneme	C^jVC (Nominative)		C^jVC^j (Locative)[21]		Gloss
/i/	[i]	[m^{j}if]	[i̟]	[m^{j}i̟^{j}f^{j}i]	*mif* 'myth'
/e/	[e]	[sv^{j}et]	[e̟]	[sv^{j}e̟t^{j}i]	*svet* 'light'
/a/	[a]	[m^{j}ásə]	[a̟]	[m^{j}a̟s^{j}i]	*mjaso* 'meat'
/o/	[o]	[m^{j}ot]	[o̟]	[m^{j}o̟d^{j}i]	*med* 'honey'
/u/	[u]	[ujút]	[u̟]	[uju̟t^{j}i]	*ujut* 'shelter'

A rule of this sort captures three generalizations. First of all, it embodies a co-occurrence restriction. It follows from the rule that fronted vowels co-occur with palatal(ized) consonants, while non-fronted vowels do not. Secondly, the rule in (2) captures a dependency relation. Since it is the vowel that undergoes the change, it is clear that it is the vowel that adapts to the consonants, and not the

20 Notice that different sources give somewhat different data, possibly because fronting is more conspicuous for non-front vowels (see Timberlake 2004: 32–40 for spectrograms and detailed discussion of the acoustic data). However, the differences have no bearing on the argument here. The data in Table 3.3 are based on the Russian Academy Grammar (Švedova (ed.) 1980: 24).

21 Throughout this book, I use the term Locative, rather than Prepositional for the Russian *predložnyj padež*.

other way around. In other words, the consonants select a fronted vowel, so the vowel depends on the consonantal environment. Third, the rule implies that the only property of the vowels that is changed is their degree of fronting. The other features remain unaffected by the rule. For instance, an underlying, phonemic /u/ is fronted to [ʉ], not, say, to [i] or [ɨ].

An alternative approach in terms of schemas is given in Figure 3.4. The compact version to the left captures the co-occurrence facts in that it states that sequences of the type palatal(ized) consonant plus fronted vowel plus palatal(ized) consonant are well-formed in Russian. In many cases this format is sufficiently precise for our purposes, but if we want to explicate the dependency relation we need the expanded version in the middle in Figure 3.4, which involves the integration relation discussed in section 2.6. The upper portion of the schema represents the string of segments as a whole, whereas the boxes at the bottom represent the parts that the string consists of. The elaboration site between the consonants shows that the consonants select a fronted vowel.

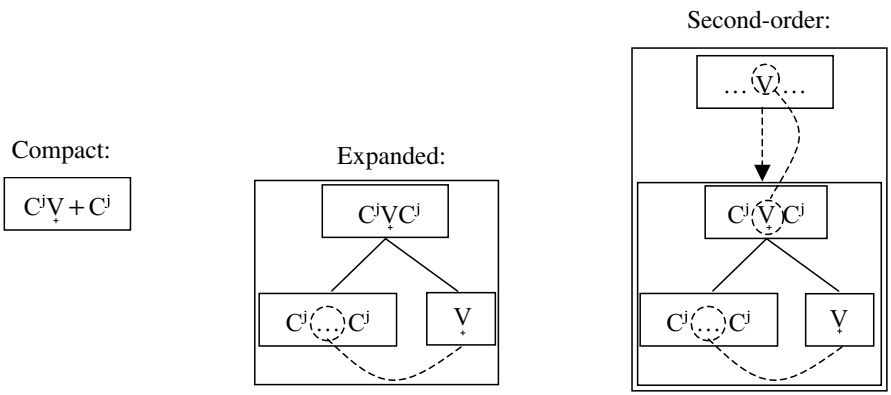

Figure 3.4. Schemas for fronting between palatal(ized) consonants

The third generalization – the fact that only the degree of fronting is affected – is a source-oriented generalization; it describes a form ("the product") by referring to another form ("the source"). As mentioned in section 2.5, in most frameworks the source is an underlying representation. However, cognitive linguists do not assume any underlying representations, so in order to capture source-oriented generalizations we must invoke related surface forms. For alternations of the type given in Table 3.3, this means the default allophone. The second-order schema in Figure 3.4 explicates the relationship between the two allophones. The upper portion represents the default allophone, which occurs in an unspecified environment, while the lower portion ensures that the fronted allophone is

flanked by palatal(ized) consonants. In order to explicate that the two allophones are identical (except for fronting), I connect the two capital V's by a dashed line. In this way, the second-order schema accommodates all three generalizations about vowel fronting. The alternation between fronted and non-fronted vowels can be adequately represented as a second-order schema.

The comparison of procedural rules and schemas in this section is relevant for a long-standing issue in phonology, viz. abstractness. For the purposes of rule (2), the most likely choice of underlying representations is the set of default allophones [i, e, a, o, u], i.e. segments that are attested on the surface. However, adherents of rule-based frameworks often posit underlying representations that are very different from the observable surface forms. An extreme, but nevertheless illustrative example is Lightner's (1972: 58) analysis of the Russian vocalism, which includes four long and four short underlying vowels. Today, most phonologists would probably consider Lightner's analysis far-fetched, since the phonemic distinction between long and short vowels was lost more than a thousand years ago. However, Lightner's analysis illustrates what is known as the abstractness issue. How different are underlying representations from the observable surface forms? The problem is that rule-based frameworks are unconstrained insofar as there is nothing to preclude analyses like the one proposed by Lightner. In Cognitive Grammar, on the other hand, abstract underlying representations are ruled out by the content requirement, which precludes reference to structures that are not attested on the surface (cf. section 2.2). Abstractness is therefore not a problem in Cognitive Grammar. As we shall see in chapter 7, schemas and categorization relationships represent a viable alternative to procedural rules and abstract underlying representations.

3.5. Schema interaction in phonology

So far we have seen that schemas replace rules in cognitive linguistics. Cognitive Grammar enables us to model interaction between schemas. Figure 3.5 is a representation of a situation where a speaker of Russian wonders how to pronounce the word *pjat'* 'five'. S/he considers two candidates, one with the default allophone [a], and one with the fronted [ạ]. In order to find out which candidate to prefer, the speaker must compare it to the relevant fragment of his or her mental grammar, which in the case at hand contains two schemas – one for each allophone. I have chosen the compact format, since the focus is on the co-occurrence restriction between vowels and palatal(ized) consonants. Because it contains a non-fronted vowel, the candidate to the left instantiates the schema for the default allophone. The candidate to the right, which displays the

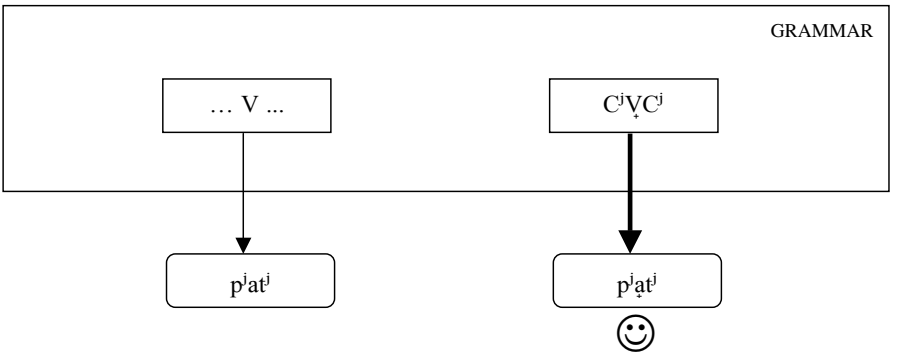

Figure 3.5. Schema interaction for fronting between palatal(ized) consonants

fronted [ạ], is compatible with the fronting schema in the grammar, as indicated by the instantiation arrow. Since the fronting schema specifies the context, while the competing schema for the default allophone does not, the fronting schema is more specific. The candidate to the right therefore shows the higher degree of conceptual overlap and is correctly predicted to be the winner.

Schema interaction as discussed here to some extent resembles the interaction of ordered rules in generative phonology. As mentioned in section 2.4, an important principle of rule ordering is the so-called Elsewhere Condition (Kiparsky 1982). We shall consider a formal definition of this principle in section 7.3; for now it is sufficient to say that a rule takes precedence if it refers to a subset of the inputs of alternative rules. As I pointed out in 2.4, this linguistic principle falls out as a special case of the broader cognitive principle of conceptual overlap. Given this principle, it is not necessary to add the Elsewhere Condition to the grammar, because schemas that are in a subset relation to other schemas will always take precedence. In other words, Cognitive Grammar offers an explanatory account of cases where a specific rule overrides a more general rule. This book explores many examples of this type. A particularly complex example is discussed in depth in chapter 7.

What about rules that are extrinsically ordered, i.e. where a certain order of application is necessary in order to produce the correct output although this order does not follow from a general principle like the Elsewhere Condition? Can such cases be accounted for in Cognitive Grammar? Examples from classical generative phonology often involve long chains of derivations from abstract underlying representations via several intermediate steps to the observable surface forms. Derivations of this sort are highly implausible from the point of view of the theories of cognition underlying cognitive linguistics (Lakoff 1993a), and

to the extent that they involve structures that do not occur on the surface or schemas over such structures, such derivations are not compatible with Cognitive Grammar.[22] Consequently, the cognitive linguist must seek very different strategies. In this book, we shall focus on a class of examples known under the heading of phonological opacity. Opacity is the topic of the following section.

3.6. Phonological opacity

Phonological opacity has been much debated in recent years, especially within Optimality Theory. In chapters 8 and 10 we shall consider some examples from Russian verbs in detail, and a brief introduction to opacity is therefore in order. Here is a definition (adapted from Kiparsky 1973: 79 and McCarthy 2002: 165, 2007: 11):

(3) A phonological rule P of the form A → B / C _ D is opaque if there are surface structures with either of the following characteristics:
   a. instances of B derived by P that occur in environments other than C _ D ("overapplication")
   b. instances of A in the environment C _ D ("underapplication").

A detailed discussion of the technicalities is not required here. Suffice it to say that overapplication is when a rule applies even though its conditioning environment is not attested on the surface. Underapplication occurs when a rule does not apply despite the presence of the relevant conditioning environment in surface forms.

The imperative formation in Russian provides examples of both over- and underapplication. Normally, the imperative has the ending /i/, but imperatives with stressed stems in a single consonant have no ending. In a rule-based model, we can account for this if we assume a rule that deletes an underlying imperative ending /i/ in the relevant environment. This imperative deletion rule interacts with a "truncation rule" (Jakobson 1948), which deletes the first member in a VV or CC sequence. Consider the derivations of the imperative singular *bros'* of *brosit'* 'throw' and the imperative plural *igrajte* of *igrat'* 'play' in (4). Deletion is represented as double strikethrough (e.g. ~~i~~).

22 Langacker (1987: 442–445) offers a brief discussion of what he calls "computation chains", which model situations that resemble ordered rules in a so-called feeding relationship. Since none of the examples to be analyzed in this book are of the relevant type, computation chains will not be discussed in the following.

(4)	Underlying representation:	brós^{j}i + i	igráj + i + t^{j}e
	Truncation:	brós^{j}i̯ + i	—
	Imperative deletion:	brós^{j} + i̯	igráj + i̯ + t^{j}e
	Surface representation:	bros^{j}	igrájt^{j}i

Imperative forms like [bros^{j}] are examples of overapplication; there the surface form lacks the stem-final [i] although there is no ending on the surface that would motivate the deletion of the stem-final vowel. In rule-based models overapplication occurs under so-called counter-bleeding, whereby a rule (in our case truncation) first applies before another rule (imperative deletion) wipes out the environment of the first rule. In the derivation of [bros^{j}], truncation of the stem-final vowel is conditioned by the ending, which is subsequently deleted by the imperative deletion rule.

The derivation of [igrajt^{j}i] illustrates the notion of "underapplication". The surface form contains the consonant-initial ending [t^{j}i], so we would expect the stem to end in a vowel, since the truncation rule deletes the first member of consonant clusters. However, this expectation is not borne out, insofar as the stem-final [j] is preserved in the surface form. In rule-based analyses, underapplication occurs under so-called counter-feeding. By deleting the imperative ending, the imperative deletion rule feeds the truncation rule by creating a CC cluster. However, the application of truncation is blocked, because truncation is ordered before the feeding rule. As a consequence of this, the surface form contains the consonant cluster [jt^{j}] despite the existence of the truncation rule in the grammar.

Is it possible to account for phonological opacity in Cognitive Grammar? It is clear that an analysis similar to the rule-based analysis in (4) is impossible. The underlying and intermediate structures in (4) do not occur on the surface, and the language users therefore cannot form schemas for such structures. The approach I shall take instead is to appeal to morphology. I shall establish morphological schemas for the imperative (including second-order schemas connecting related morphological forms) which for reasons of conceptual overlap override the general schemas for the truncation alternation. On this basis I shall argue that phonological opacity boils down to relations between morphological forms. A detailed discussion of the imperative will be given in chapter 8, and in chapter 10 I shall explore an example of opacity with regard to the softening alternation, which provides further evidence in favor of a morphological approach to phonological opacity.

Adopting a morphological approach to opacity and abstract phonology in general, I place myself in a long tradition of linguistic research.[23] It is well known from historical linguistics that phonological rules often morphologize, i.e. that a phonologically defined conditioning environment is reinterpreted as morphological (Lass 1984: 320ff, Bybee 2001: 55 and references therein). The notion of morphologically conditioned alternation was adopted in synchronic studies by the structuralists (cf. e.g. Bloomfield 1933: 211). Classical generative phonology (e.g. Chomsky and Halle 1968, Lightner 1972) breaks with this tradition; by means of the extremely powerful mechanisms of abstract underlying representations and ordered phonological rules, it seeks to describe virtually all alternations as phonologically conditioned. As Bybee (1985: v) puts it, "[a]bstract generative phonology [tries] to equate morpho-phonemics with phonology, and thereby reduce its arbitrariness". The frameworks of Natural Phonology (Stampe 1973), Natural Generative Phonology (Hooper 1976) and Natural Morphology (Dressler 1985) represent a reaction against the generative approach, insofar as they "propose to distinguish alternations that have a true and consistent phonetic conditioning from those that are lexicalized or morphologized" (Bybee 2001: 65). Cognitive Grammar can be considered a continuation of this reaction, as well as of pre-generative traditions. The importance of the relationship between cognitive linguistics and the "naturalist frameworks" should not be underestimated (cf. Dressler 1990 and Nathan 1986 and 1996 for discussion). This being said, however, I hasten to add that Cognitive Grammar and cognitive linguistics in general have something new to offer. Showing that a principled account is possible in terms of a parsimonious set of notions based on well-known, general cognitive principles, Cognitive Grammar contributes a new explanatory perspective to the study of opacity and other examples of abstract phonology.

3.7. Neutralization: (De)voicing of obstruents

Although the oppositions between the phonemes in Tables 3.1 and 3.2 are maintained in some environments, there are environments where the oppositions are neutralized. An example is the opposition between voiced and voiceless obstruents that is neutralized word-finally; in this position only voiceless obstruents occur. Since neutralization is characteristic for Russian phonology and

23 It is interesting to note that a morphological approach to opacity has also been pursued in some recent work in Optimality Theory. For discussion, see McCarthy (2007: 12) and references therein.

Table 3.4. Devoicing word-finally and before voiceless obstruent

_ V (Nom sg)		_ ## (Gen pl)		_ [voiceless obstruent] (Diminutive)		Gloss:
[b]	[trubá]	[p]	[trup]	[p]	[trúpkə]	*truba* 'pipe'
[v]	[slʲívə]	[f]	[slʲif]	[f]	[slʲífkə]	*sliva* 'plum'
[d]	[jágədə]	[t]	[jágət]	[t]	[jágətkə]	*jagoda* 'berry'
[z]	[slʲizá]	[s]	[slʲós]	[s]	[slʲóskə]	*sleza* 'teardrop'
[ʐ]	[rʌgóʐə]	[ʂ]	[rʌgóʂ]	[ʂ]	[rʌgóʂkə]	*ragoža* 'bast mat'
[g]	[knʲígə]	[k]	[knʲik]	[ʂ]	[knʲíʂkə][24]	*kniga* 'book'

Table 3.5. Voicing before voiced obstruents

Noun		Noun + *by* (subjunctive)		Gloss
[p]	[trup]	[b]	[trúb bɨ]	*trup* 'corpse'
[f]	[mʲif]	[v]	[mʲív bɨ]	*mif* 'myth'
[t]	[svʲet]	[d]	[svʲéd bɨ]	*svet* 'light'
[s]	[nos]	[z]	[nóz bɨ]	*nos* 'nose'
[ts]	[ʌtʲets]	[dz]	[ʌtʲédz bɨ]	*otec* 'father'
[ʂ]	[duʂ]	[ʐ]	[dúʐ bɨ]	*duš* 'shower'
[ʃʲ:]	[xvoʃʲ:]	[ʒʲ:]	[xvóʒʲ: bɨ]	*xvošč* 'horse-tail (plant)'
[tʃʲ]	[vratʃʲ]	[dʒʲ]	[vrádʒʲ bɨ]	*vrač* 'doctor'
[k]	[mak]	[g]	[mág bɨ]	*mak* 'poppy'
[x]	[smʲéx]	[ɣ]	[smʲeɣ bɨ]	*smex* 'laughter'

since some examples will be discussed in detail in this book, I will give a brief overview of some relevant phenomena in this and the two following sections.

Table 3.4 contains data illustrating devoicing in word-final position and obstruent clusters, while data for voicing assimilation are given in Table 3.5. The following generalizations can be advanced:

(5) a. Final devoicing: Only voiceless obstruents occur in word-final position.
b. Regressive devoicing: If the last member of an obstruent cluster is voiceless, then the preceding member is also voiceless.
c. Regressive voicing: If the last member of an obstruent cluster is voiced, then the preceding member is also voiced.

24 In addition to devoicing, /g/ is subject to the so-called transitive softening alternation before the diminutive suffix. Chapters 9 and 10 offer a detailed analysis of this alternation in Russian verbs.

How can these phenomena be accommodated in cognitive linguistics? Consider the schemas in Figure 3.6, which are given in the "expanded" format of Figure 3.4 above. The upper box in each schema represents the relevant strings of segments as wholes. They capture the generalization that these strings are well-formed in Russian. As mentioned in sections 2.3 and 3.3, prohibitions stated in negative terms cannot be represented as schemas. The fact that voiced obstruents are not attested in word-final position follows from the absence of a schema for this in the grammar. Likewise, the absence of schemas for clusters consisting of one voiced and one voiceless consonant accounts for the ill-formedness of these clusters in Russian. In order to explicate that assimilation is regressive, I make use of elaboration sites (cf. section 2.6). The encircled suspension points show that the relevant environment must be preceded by something, and the dashed correspondence lines clarifiy what this "something" is. In this way, we capture the generalization that it is the segment (or the pause) to the right that selects the segment to the left, i.e. that (de)voicing is regressive.

The schemas in Figure 3.6 suggest that Cognitive Grammar facilitates a straightforward account of voicing and devoicing, which does not require any ad hoc machinery. Voicing and devoicing are relevant for the discussion of neutralization in exceptional infinitives in chapter 6. We shall return to the schemas developed in this section there.

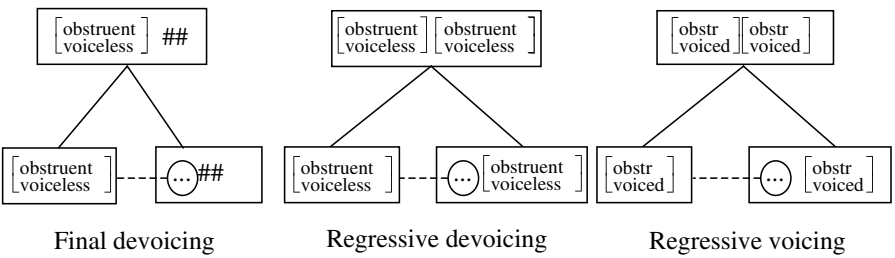

Figure 3.6. Schemas for neutralization of voice opposition in Russian obstruents

3.8. Neutralization: Palatalization

Russian has a distinctive opposition between palatalized and non-palatalized consonants as can be seen from minimal pairs like /mat/ 'mate' and /mat^{j}/ 'mother'. However, the opposition is not maintained in all environments. In the following we shall consider two of the environments where palatalization is neutralized.

Table 3.6. Regressive softening assimilation

_ T (Nominative)		_ T^j (Locative)		Gloss:
[st]	*nevesta*	[s^jt^j]	*neveste*	'bride'
[zd]	*zvezda*	[z^jd^j]	*zvezde*	'star'
[ts]	*butsa*	[t^js^j]	*butse*	'football boot'

The first environment involves consonant clusters where the last member is palatalized. In this book, we shall only consider regressive palatalization (softening) assimilation in consonant clusters where both members are alveolar obstruents, since this is the only cluster type directly relevant for the analysis of the Russian verb stem.[25] Relevant data are given in Table 3.6. In the nominative singular form of nouns, where the rightmost member of the cluster is non-palatalized, the preceding consonant is also non-palatalized. When the rightmost member of the cluster is palatalized because of the locative ending, the preceding consonant is also palatalized. The generalization can be stated as follows: only palatalized alveolar obstruents occur before palatalized alveolar obstruents (Avanesov 1984: 150–151, Panov 1967: 91 and Švedova (ed.) 1980: 45). In the schema in Figure 3.7, T^j stands for a palatalized alveolar obstruent. As shown by the elaboration site preceding the rightmost segment, a palatalized alveolar obstruent requires that a preceding alveolar obstruent be palatalized.

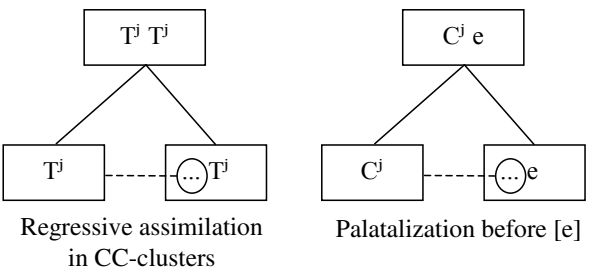

Figure 3.7. Schema for regressive softening assimilation and softening before [e]

Regressive palatalization assimilation is an example of neutralization. Since only palatalized alveolar obstruents are attested before palatalized alveolar ob-

25 As pointed out by Timberlake (2004: 61), palatalization assimilation is losing ground in present-day Russian, thus creating a complex situation with extensive variation. Although sociolinguistic data indicate that far from all speakers have assimilation in their speech today (Krysin (ed.) 1974: 43–59), we shall focus on the somewhat archaic pronunciation with assimilation, which provides an opportunity to explore a cognitive approach to the important phenomena of assimilation and neutralization.

struents, the opposition between palatalized and non-palatalized segments is not maintained in this environment. However, neutralization of the palatalization opposition is not restricted to preconsonantal position. As was alluded to above, consonants are palatalized before [e], e.g. in the locative forms in Table 3.6. This generalization is captured in the schema to the right in Figure 3.7. The elaboration site before [e] shows that this segment requires a preceding palatal(ized) consonant, here represented as C^j. The absence of a schema for non-palatalized consonants before [e] accommodates the non-permissibility of such strings.[26]

It should be pointed out that although historically this generalization was true across the board, over the last thousand years or so it "has been eroded in various ways" (Timberlake 2004: 58). First of all, there are a few consonants that consistently resist palatalization: /s̨, z̨, ts/. Thus, locative forms of nouns like *erš* 'ruff (Acerina cernua)', *nož* 'knife' and *dvorec* 'palace' end in the strings [s̨e], [z̨e] and [tse] with hard consonants. Secondly, palatalization does not occur in certain morpho-syntactic contexts. Verb prefixes and proclitic prepositions resist palatalization, as witnessed by verb forms like *sèkonomit'* 'economize' with hard [s] and phrases like *v ètom dome* 'in this house' with hard [v]. A hard consonant is also attested in acronyms like *NÈP* (*Novaja Èkonomičeskaja Politika* 'New Economic Policy'). Third, there are many exceptions from the generalization in borrowings. For instance the noun *tennis* 'tennis' is pronounced with a hard [t] according to normative dictionaries like Ožegov and Švedova (1992). Detailed discussion of the exceptions to palatalization before [e] is beyond the scope of this book. Suffice it to say that the fact that normative dictionaries explicitly state that words like *tennis* are supposed to be pronounced with a hard consonant, suggests that the schema for palatalization before [e] in Figure 3.7 has some psychological validity. If many language users were not inclined to palatalize before [e], recommendations like this would be redundant.

The examples of palatalization discussed above are closely related to the softening alternation in Russian verb stems – one of the two main topics of this book. A thorough overview of the softening alternations will be given in section 4.7. At this stage, I will limit myself to pointing out a difference. Although we have seen examples of morphologically conditioned exceptions, the cases discussed in this section are essentially phonological, insofar as palatalization occurs in an environment that can be described in terms of the sound shape of surface forms. This is not the case for the softening alternation in Russian verbs, where morphology is pivotal, although we shall see that phonological factors

26 The palatalization schema in Figure 3.7 is simplistic insofar as it does not take into account the realization of vowels in unstressed syllables. Unstressed vowels will be discussed in section 3.9.

are at play too. Chapters 9 and 10 are devoted to the softening alternation. The discussion of regressive palatalization assimilation in consonant clusters is relevant for the analysis of exceptional infinitives in chapter 6.

3.9. Neutralization: Vowels in unstressed syllables

Neutralization is not restricted to consonants; while there are five contrastive vowels in stressed syllables, there are only three in unstressed syllables, as shown in Table 3.7 and Figure 3.8. This phenomenon, which is traditionally known as "vowel reduction", interacts with fronting for vowels preceded by palatal(ized) consonants. However, we shall only consider environments without fronting effects in this section, since they are sufficient to illustrate a cognitive approach to vowel reduction. Furthermore, we shall only be concerned with Contemporary Standard Russian; Russian dialects show a wide variety of complex patterns that will not be treated in the following. It is necessary to distinguish between two unstressed positions, because [á, ó] alternate with [ʌ] in the syllable preceding the stressed syllable, but with [ə] elsewhere. Crosswhite (2001: 61 and 106–107) suggests that the stressed syllable and the syllable immediately before it each have a mora, while other syllables do not. Detailed discussion of this proposal (and the notion of "mora") is well beyond the scope of this book. Suffice it to say that Crosswhite's proposal facilitates a three-way distinction between syllables with stress and mora ($\acute{\sigma}_{\mu}$), syllables with a mora, but no stress (σ_{μ}), and syllables with neither stress nor mora (σ).[27]

The data in Table 3.7 and Figure 3.8 suggest four generalizations:

(6) a. Stressed high vowels alternate with high vowels in unstressed syllables.
b. Stressed mid and low vowels alternate with [ə] in unstressed syllables.
c. Stressed mid and low vowels alternate with [ʌ] in moraic unstressed syllables.
d. [é] alternates with [ɨ] in unstressed syllables.

The statement in (6a) summarizes the somewhat trivial, but nevertheless important generalization that /i/ and /u/ maintain essentially the same quality in unstressed syllables, whereas mid and low vowels are involved in more complicated alternations described in (6b–d). Statement (6b) is the default pattern

27 Notice that in word-initial position, we have [ʌ], not [ə], as in the nominative plural form [ʌkərʌká] of [ókərək] 'hamhock'. This suggests that word-initial vowels are moraic (cf. Crosswhite 2001: 74–75).

Table 3.7. Vowel reduction

Phoneme:	σ́μ		σμ		σ		Gloss:
/i/:	[ɨ]:	[sɨ́rə]	[ɨ]:	[sɨrój]	[ɨ]:	[sɨrʌvátə]	‘moist’
/e/:	[e]:	[ʐémtʃʲuk]	[ɨ]:	[ʐɨmtʃʲúʐɨnə]	[ɨ]:	[ʐɨmtʃʲugá]	‘pearl’
/a/:	[a]:	[stárɨj]	[ʌ]:	[stʌrʲík]	[ə]:	[stərʲitʃʲók]	‘old’
/o/:	[o]:	[góləvu]	[ʌ]:	[gʌlóf]	[ə]:	[gəlʌvám]	‘head’
/u/:	[u]:	[pust]	[u]:	[pustój]	[u]:	[pustʌtá]	‘empty’

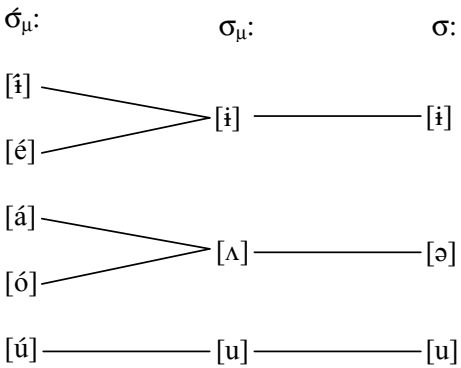

Figure 3.8. Vowel reduction patterns

concerning the majority of mid and low vowels (/a, o/) in the majority of environments (all unstressed syllables without a mora). It is overridden by (6c) for mid and low vowels in moraic unstressed syllables, and by (6d) for /e/ in all unstressed syllables.[28]

The generalizations in (6) are source-oriented. In order to get the reduction pattern right, it is necessary to compare the unstressed vowel to the corresponding vowel under stress. For this reason we need second-order schemas to represent them adequately. I propose the four schemas in Figure 3.9 where σ́μ represents a stressed moraic syllable and σμ an unstressed moraic syllable. Two points are worth mentioning. First, I use the schema [mid-low] for /e, a,

28 Historically, the behavior of /e/ is different due to a fronting effect, because in the native vocabulary /e/ is only attested after non-palatalized consonants that were formerly palatalized. However, as pointed out by Crosswhite (2001: 106–107), such an analysis is not viable for Contemporary Standard Russian, since [é] alternates with [ɨ] in vowel-inital syllables too, where no fronting effect due to a preceding consonant can be assumed.

o/ in order to emphasize that we are not dealing with a negatively specified set of vowels that lack the specification [high]. Mid and low vowels occupy a continuous part of the vowel space that can be positively specified as involving a relative high degree of openness. The second point concerns the two rightmost schemas, which correspond to (6c-d). These schemas are more specific than the competing schema (second from right). The rightmost schema specifies the stressed alternant as [é] rather than [mid-low], and the second schema from the right only applies to moraic syllables, rather than unstressed syllables in general. Since they are more specific, the two schemas to the right will be easier to activate than the competing schema for mid and low vowels, and they will automatically take precedence over their competitor.

Vowel reduction in Russian is a complex phenomenon. Although this section does not consider all the relevant data, the schemas in Figure 3.9 demonstrate that vowel reduction can be accounted for in Cognitive Grammar.

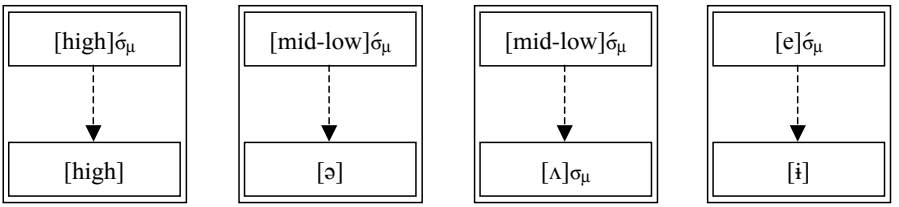

Figure 3.9. Second-order schemas for vowel reduction

3.10. Transcription in the rest of the book

In this book, I argue against abstract underlying representations. Accordingly, examples are given in phonetic transcription and enclosed in square brackets ([]). However, in order to avoid unnecessary cumbersome diagrams, I omit brackets in figures and tables. The transcription reflects voicing and devoicing of obstruents (section 3.7) and softening assimilation (section 3.8). This is a book about consonant alternations, and my general policy for the transcription of vowels is to disregard phonetic detail that does not have a bearing on my argument. Therefore, I omit the + sign under vowels between two soft consonants, and thus render *mjat'* 'crumple' as [mʲatʲ] instead of the more precise [mʲa̟tʲ]. I furthermore disregard the difference between [i] and [ɨ], which is irrelevant for my line of argumentation. In other words, I will represent *myt'* 'wash' as [mitʲ], not as [mɨtʲ]. In the previous section, we saw that vowel reduction can be accounted for in Cognitive Grammar. However, since vowel reduction is tangential to the

topic of this book I shall employ a simplified representation in the remaining chapters. Instead of the symbols [ʌ, ə], I will use [a] in unstressed syllables, and thus render *govorit'* 'speak' as [gavarʲítʲ], not [gəvʌrʲítʲ]. As mentioned in section 3.9, vowel reduction interacts with vowel fronting. For the purposes of this book, I will use the symbol [i] for the unstressed vowel that alternates with stressed [i, e, a, o] after soft consonants. For example, *vzjala* '(she) took' will be represented as [vzʲilá]. Summarizing, the relatively broad phonetic transcription I have chosen is sufficiently precise for the analysis I will present in the rest of this book.

3.11. Conclusion

In this chapter, I have shown how some key concepts in phonology can be treated in Cognitive Grammar and cognitive linguistics in general. We saw that phonemes and allophones (section 3.1), phoneme systems (3.2) and phonological features (3.3) can be represented as schemas and category networks. In sections 3.4 through 3.6, it was argued that schemas offer a viable alternative to phonological rules and their interaction. Finally, in sections 3.7 through 3.9 it was suggested that the important phenomenon of neutralization can also be represented by means of schemas. Taken together, all this suggests that Cognitive Grammar provides an insightful approach to phonology based on the parsimonious set of theoretical concepts presented in chapter 2. No ad hoc machinery is required in order to analyze phonology in Cognitive Grammar.

Although this chapter has not provided a full-fledged analysis of Russian phonology, the discussion of relevant phenomena is sufficiently detailed to serve as a basis for the analysis of Russian morphology. With the tools explored in the present and the previous chapters in our hands, we are now ready to approach the morphology of Russian verbs. This is the topic of the next chapter.

Chapter 4
A cognitive approach to morphology

How can morphology be analyzed in Cognitive Grammar? Is it possible to give insightful analyses of the structure of words by means of the tools described in chapters 2 and 3? I have no pretensions to present an extensive theory of morphology in cognitive linguistics, nor will I provide an in-depth analysis of the entire morphological system of Russian. The aim of this chapter is only to introduce the characteristics of Russian verb morphology that are relevant for this book, as well as some key theoretical concepts my analysis hinges on. However, as far as it goes, the analysis does indeed suggest that Cognitive Grammar provides the tools required for insightful morphological analysis. Section 4.1 shows how stems, roots, derivational suffixes and inflectional endings can be represented as schemas, and sections 4.2 and 4.3 demonstrate that no extra machinery is necessary in order to accommodate inflectional paradigms and inflectional classes in Cognitive Grammar. After a brief discussion of segmentation in section 4.4, in sections 4.5 through 4.7 we turn to a presentation of the Russian verb inventory and the truncation and softening alternations, the conspiracy of which is the topic of the remaining chapters of this book.

4.1. Stem, root, suffix and ending as schemas

When language users are exposed to Russian speech, they form schemas capturing similarities among recurring chunks that we may call "words". Such schemas are bipolar; they represent signs in the sense of Saussure (1984) in that they combine form and meaning. For the purposes of this book, I shall represent the form of a word as a string of sounds. The meaning of a word will be represented as an English gloss (e.g. 'do' and 'play') supplemented by a set of features like "first person", "singular" and "present tense". More accurate representations of form and meaning are compatible with cognitive linguistics, but these simple representations are sufficiently precise for our purposes. As mentioned in section 2.2, "meaning" is understood in a broad sense in cognitive linguistics and includes grammatical meaning, i.e. grammatical categories and parts of speech.

Figure 4.1 contains schemas for six nouns and verbs that are related in various ways. Comparing the schemas for [igráju] 'play (1 singular)' [igrájitʲi] 'play (2 plural)', the language user notices that they both involve the string [igráj]

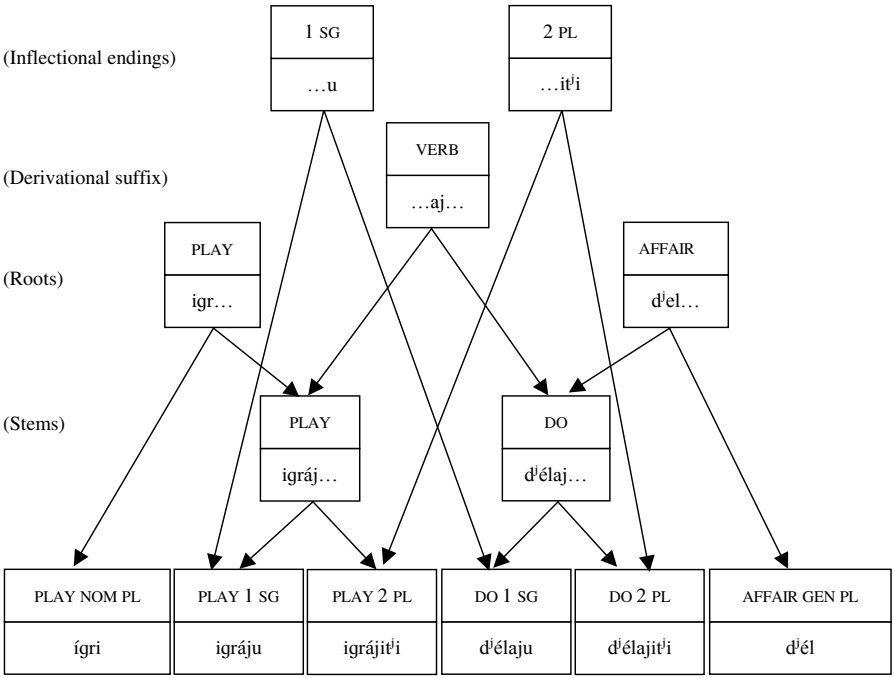

Figure 4.1. Stems, roots, suffixes and endings as schemas

and the meaning 'play'. This information can be represented in a schema over the two verb forms – a schema that represents the stem of the verb. In a similar fashion, the language user may form a schema for the stem [dʲélaj] on the basis of the two forms of this verb in the figure.

If the language user compares the schemas for the verb stems with the schemas for the nouns in the figure, it becomes clear that both verbs and nouns share the strings [igr] and [dʲel], respectively. They also have related meanings. In the case of [igr], both noun and verb involve the concept of playing. For [dʲel], it is a little harder to establish the semantic connection. The verb *delat'* means 'do', while the meaning of the corresponding noun *delo* is 'affair, business', i.e. what one does. For simplicity I represent the shared meaning as 'affair'. However, nothing hinges on this; what is important in this connection is the fact that it is possible to describe roots as bipolar schemas combining form and meaning.

Comparing the schemas for the verb stems in Figure 4.1, the language user may also notice that both stems end in [aj], and that the words with this string in the figure are all verbs. On this basis s/he may establish a schema combining this

string of sounds with the meaning, which I shall simply represent as 'verb'.[29] The point is not to give a maximally accurate representation of the meaning, but to show that what is traditionally referred to as a "verbal suffix" can be represented in terms of bipolar schemas.[30]

The language user may also compare [igráju] to [dʲélaju], and [igrájitʲi] to [dʲélajitʲi]. In the former case, the two verb forms contain [u], corresponding to the features "1 singular", while in the latter the two forms share the string [itʲi] and the features "2 plural". These generalizations can be captured in schemas representing inflectional endings. A note on terminology is appropriate here. In a way that parallels the use of *okončanie* and *suffiks* in Russian, I shall use "ending" about inflectional morphology and "suffix" about derivation. The derivational suffixes will also be referred to as "verbal suffixes", since this book focuses on the word-formation of verbs.[31]

Summarizing this section, we have seen that the notions of "stem", "root", "derivational suffix" and "inflectional ending" can be represented as bipolar schemas relating form and meaning. In other words, the toolbox of a cognitive linguist does not require any additions in order to account for these key concepts in morphology.

---

29 Langacker (1987: 244–274) employs the label "process" for the meaning of verbs, but I shall not follow this practice here, since nothing hinges on it in the present context.

30 A remark on the status of affixes is in order. Are affixes Saussurian signs? The answer depends on the theoretical perspective. In morpheme-based frameworks, the answer is clearly in the affirmative, insofar as affixes are morphemes, i.e. minimal pairings of form and meaning. Adherents of realizational approaches like Matthews' (1972) Word and Paradigm Model, on the other hand, may be more inclined to regard the *word* as the minimal sign (cf. e.g. Blevins 2006). Category networks of the type presented in Figure 4.1 capture the key insights in both kinds of morphological models. Like morpheme-based frameworks, category networks represent affixes as pairings of form and meaning. However, the schemas for affixes do not exist independently of the words they are schemas for. In this way, Cognitive Grammar resembles realizational approaches to morphology where affixes are seen as meaningful entities only when they attach to a stem in the context of a word.

31 Some readers may find the term "derivation" confusing. The term is not used in its phonological sense, where it describes a series of transformations that convert an underlying representation into a surface form. Rather, "derivation" is used in its morphological sense, where it characterizes affixes that create new lexemes when attached to a stem. Let me point out that my use of "derivation" and "inflection" does not entail that I assume a clear-cut boundary between these areas.

4.2. Inflectional paradigm and paradigm structure

An inflectional paradigm consists of all the words that share a stem, but have different inflectional endings.[32] The Russian verb paradigm contains the forms listed in Table 4.1, which also gives an overview of the endings relevant for each cell. The endings are given in the form they have in stressed syllables. It is useful to divide the paradigm into four subparadigms – present tense, imperative, past tense and infinitive – since the subparadigms behave differently with regard to stem alternations.[33] As can be seen from the table, the present and past tense subparadigms contain finite forms, as well as participles and gerunds. The present and past tense gerunds could be characterized more precisely as imperfective and perfective gerunds (Rappaport 1984), but I shall use the traditional terms since for the overwhelming majority of verbs these forms belong formally in the present and past tense subparadigms respectively. The participle endings in the table are followed by adjectival agreement endings that are not relevant for the topic of this book.

In two cases, it is necessary to comment on the endings in the table. In the past active participle and the gerund, the endings are pronounced with a voiceless [f]. In a phonemic analysis, one might nevertheless adopt the underlying representations /vʂ/ and /v/ and assume that they undergo devoicing. While such an analysis would be in line with orthography, there are no phonological arguments in favor of it, since the endings do not participate in voiceless ∼ voiced alternations in Contemporary Standard Russian (Flier 1981: 81). In the infinitive I have given an ending [tʃʲ]. However, the segmentation of infinitives like *peč'* 'bake' is problematic, a fact we shall return to in chapter 6.

32 Two comments are in order. First, this definition does not accommodate suppletion, i.e. paradigms with two stems that for the purposes of synchronic analysis are unrelated. An example from Russian is *idti* 'walk' (cf. [id+ú] '(I) walk' vs. [ʂó+l] '(he) walked'). Suppletion is not relevant for the topic of this book. Second, the definition suggests that inflectional paradigms are categories with clear-cut boundaries. If one assumes that derivation and inflection are endpoints on a scale rather than categories with clear-cut boundaries, it follows that inflectional paradigms have fuzzy boundaries. I shall not pursue this issue here, since it is tangential to the topic of the present study. Let me point out, however, that the theory about categories as structured networks that is assumed in cognitive linguistics, is compatible with fuzzy category boundaries.

33 My use of the term "present tense subparadigm" should not be taken to indicate that the verb forms in question always have present tense. The relevant forms of perfective verbs normally describe events posterior to the moment of speech and thus display future tense. We shall return to the meanings of the forms in the present tense subparadigm in section 5.4.

Table 4.1. The Russian verb paradigm

		Inflectional endings:
Present tense	1 singular	u
	2 singular	oʂ, iʂ
	3 singular	ot, it
	1 plural	om, im
	2 plural	otʲi, itʲi
	3 plural	ut, at
	Passive participle	om, im
	Active participle	uʃʲ:, aʃʲ:
	Gerund	a
Imperative	2 singular	i, Ø
	2 plural	itʲi, tʲi
Past tense	Masculine singular	l, Ø
	Feminine singular	la
	Neuter singular	lo
	Plural	lʲi
	Passive participle	n, on, t
	Active participle	fʂ, ʂ
	Gerund	f
Infinitive		tʲ, tʲi, tʃʲ

Notice that the endings tend to start with vowels in the present tense and imperative paradigm. The only exception is the imperative where some verbs lack an ending in the singular (marked as Ø in the table), and have [tʲi] in the plural. In the past tense and infinitive subparadigms, endings are consonant-initial with the exception of [on] in the past passive participle. The distinction between vowel- and consonant-initial endings is important for the understanding of the truncation alternation, as we shall see in chapter 5.

In Table 4.1, the paradigm is represented as an unordered list. Although this simple, traditional format may be helpful in many ways, it veils the fact that paradigms have hierarchical structure. Wurzel (1984: 116–124 and 1989: 112–121) shows that there are implicational relationships between the forms in a paradigm and analyzes the organization of paradigms in terms of what he called

"paradigm structure conditions". In a similar vein, Bybee (1985: 50–58) argues that some forms have a privileged status in that they serve as "bases" for other forms, which she calls "derived".[34] The Russian verb paradigm features a good example of a basic-derived relationship. As shown in Table 4.1, the 3 plural present tense has the endings [ut] and [at] and the active present participle has the endings [uʃʲ:] and [aʃʲ:]. The distribution of the endings is not random. If a verb has [u] in one form, it has the same vowel in the other. Likewise, if a verb has [a] in one of the forms, it has the same vowel in the other. Matthews (1972: 86 et passim) notes that such systematic co-variation between endings is not easily captured by a rule-based model where morphological rules add an ending to an underlying stem. If we assume one rule adding [ut] in the 3 plural and another adding [uʃʲ:] in the participle, we generate the correct forms, but we do not express formally the generalization about the similarity between the endings. In order to circumvent the problem, we might divide the endings in two parts and assume a rule introducing [u] to both forms, and then have later rules adding [t] in the 3 plural and [ʃʲ:] in the participle. However, this strategy is not very successful either, for what meaning does the putative [u] ending carry? There is no set of inflectional features that unites the 3 plural present tense and the active present participle (and only these forms). In order to repair the weakness, one needs a different type of rule that connects the forms in the paradigm directly, not via a shared underlying stem. Matthews (1991: 201) refers to such rules as "metarules", while Zwicky (1991) and Stump (1993) use the term "rule of referral". Aronoff (1994) proposes an account in terms of what he calles "morphomes". An evaluation of the merits of these proposals is beyond the scope of this study, but it is interesting to notice that cognitive linguistics does not need any additional machinery in order to accommodate basic-derived relationships. From the perspective of cognitive linguistics, paradigms are structured networks of schemas for words connected by categorizing relationships. Generalizations about basic-derived relationships can be represented as second-order schemas specifying the systematic co-variation between two forms in a paradigm. The schemas in Figure 4.2 capture the relationship between the 3 plural and the active participle in Russian. There are two second-order schemas in the lower portion of the figure, one for verbs with [u] and one for verbs with [a] in the endings. Both schemas are instantiations of the more general schema in the upper portion of the figure. The dashed line connecting the capital V's in this schema represents the fact that the 3 plural and the active participle have the same vowel in the endings. Notice that in all the schemas in Figure 4.2 there are

34 Bybee's term "derived" does not indicate that we are dealing with derivational morphology (as opposed to inflection). The basic-derived relationships we shall consider in this book hold between forms within the inflectional paradigm of Russian verbs.

unidirectional extension arrows pointing at the participle, thus suggesting that the participle is "derived" and the 3 plural the "base". Whether this corresponds to generalizations in the mental grammars of speakers of Russian is an empirical question that I will not pursue here. At this point my intention is not to provide an in-depth analysis of the data, but rather to illustrate the analytical tools of Cognitive Grammar and their predictions for morphological analysis.

An analysis of paradigm structure in terms of basic-derived relations or paradigm structure conditions (represented as second-order schemas in this book) involves several empirical predictions (see Bybee 1985: 57–78 for discussion). First of all, we expect basic-derived relations to hold between semantically related forms. Cognitive Grammar acknowledges both asymmetrical relations (represented as unidirectional extension arrows) and symmetrical relations (represented as double-headed extension arrows). For asymmetrical relations, we expect semantically unmarked forms to serve as bases for marked forms. Furthermore, we expect bases to have higher frequency than derived forms. Interesting as these predictions may be, however, they will not be pursued in this book.

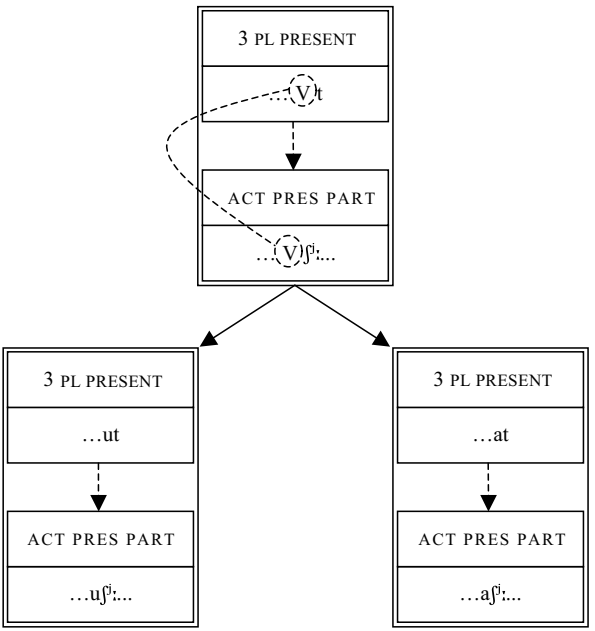

Figure 4.2. Basic-derived relationships as second-order schemas

Before we move beyond paradigms, a final theoretical point should be made. In the discussion of phonology, we saw that second-order schemas can represent alternations, e.g. of the type attested in the examples of neutralization considered in sections 3.7–3.9. It is interesting to note that second-order schemas are also relevant for morphology, where they accommodate basic-derived relationships/paradigm structure conditions. By using the same theoretical machinery in the analysis of alternations in phonology and basic-derived relationships in morphology, Cognitive Grammar manages to unify these seemingly disparate phenomena as special cases of the same general cognitive phenomenon.

4.3. Inflection class

Russian has two sets of endings for the finite forms in the present tense, as shown in Table 4.1 above. Either a verb combines with the endings in [o] and [u], or it takes endings beginning with [i] and [a].[35] In traditional terminology, Russian has two inflection classes ("conjugations"). The question is how they can be accounted for in cognitive linguistics. Once again, we shall see that schemas and categorizing relationships are all we need. Figure 4.3 contains schemas for all the finite present tense forms with two alternative endings, i.e. all forms but the 1 singular. The upper parts of the boxes represent the meanings of the forms in question. Due to considerations of space, I abbreviate "singular" as SG, "plural" as PL, "present tense" as PS. Each schema specifies the shape of the ending, which is preceded by a capital C and suspension points indicating that there are no restrictions on the shape of the stem in the present tense, except that it ends in a consonant. However, the strings "…C" are linked by dashed lines, which show that whatever the shape of the stem is, it is the same for all the connected forms.[36] In this way, we capture the generalization that if a stem combines with, say, the ending [ot] in the 3 singular, it also takes the ending [om] in the 1 plural, not the alternative [im]. This is essentially what inflection classes are in cognitive linguistics – sets of schemas for words that take the same endings. (For a similar example showing how this approach accommodates the

35 Notice that the discussion of the endings is based on their shape in stressed position. Vowel reduction (discussed in section 3.9) complicates the picture somewhat, but the discussion is precise enough in order to illustrate how inflection classes can be accommodated in Cognitive Grammar.

36 This is a slight simplification since it ignores the truncation alternation of stem-final consonants, to which we return in section 4.6. However, the statement suffices to illustrate how inflection classes can be accounted for in Cognitive Grammar, which is the main purpose of the present section.

non-concatenative morphology of modern Aramaic, the reader may want to consult Langacker 1999: 139–142)

The topmost schemas in Figure 4.3 state that all endings in the first conjugation involve a rounded vowel followed by a consonant, and that the endings in the second conjugation have an unrounded vowel and a consonant. In this way, we capture the generalization that there is a systematic correlation between vowel rounding and inflection class in Russian verbs. Notice, however, that such generalizations are not a necessary prerequisite for inflection classes. It is not always the case that the endings in an inflection class have similar sound shapes. The topmost schemas capture generalizations within each conjugation, but it is also possible to formulate schemas generalizing across the two classes. For instance, the 2 singular endings [oʂ] and [iʂ] both contain [ʂ], a fact that can be expressed as a schema. However, since schemas of this sort are not relevant for the argument here, they are not included in the figure.

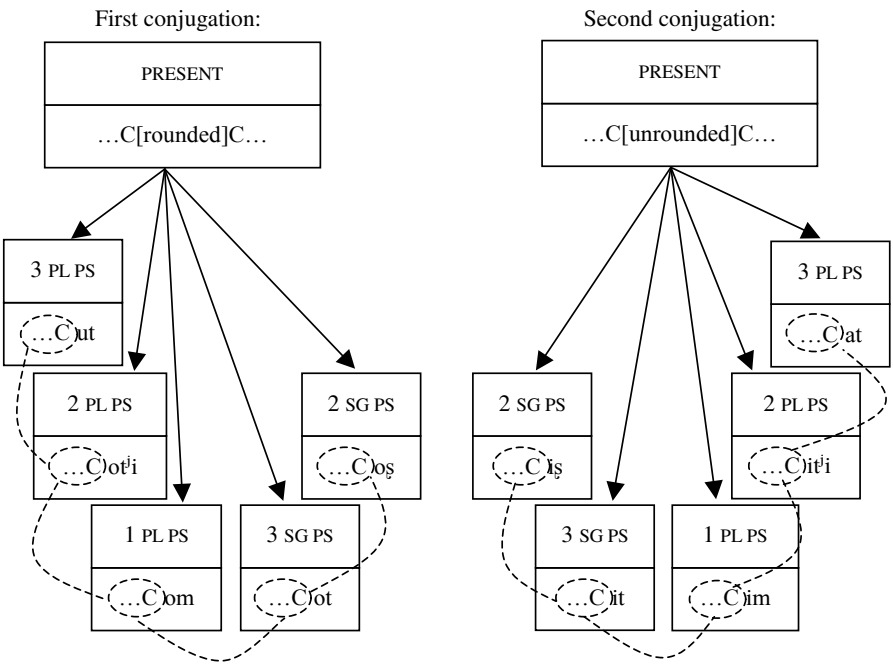

Figure 4.3. Inflection classes as category networks

4.4. Segmentation

Segmentation plays an important role in traditional morphological analysis. In order to account for the structure of words, analysts locate morphemes and draw lines (morpheme boundaries) between them.[37] In this section, we shall see that cognitive linguistics is flexible with regard to segmentation. While the framework is compatible with segmentation into morphemes, it is also able to capture generalizations without establishing morpheme boundaries. In other words, a cognitive linguist can segment, but s/he does not have to.

In order to see that schemas and categorization relations are independent of segmentation, we can go back to Figure 4.3 above. The topmost schemas capture the generalization that a finite present tense form contains a CVC string where the vowel is rounded (in the first conjugation) or unrounded (in the second conjugation). This CVC string does not correspond to a morpheme; the first consonant is part of the stem, while the following vowel and consonant belong to the inflectional ending. In other words, networks of schemas and categorizing relationships capture similarities among words without segmenting them into morphemes. This being said, there is nothing in the framework of cognitive linguistics that would prevent a schema from corresponding to a morpheme; in section 4.1 we saw that it is possible to represent morphemes (roots, derivational suffixes and inflectional endings) as schemas. However, it is important to notice that there does not have to be a one-to-one relationship between schema and morpheme.

Sometimes it is necessary to refer to the boundaries between morphemes in order to capture generalizations. In this book, for instance, we shall consider cases where inflectional endings of a particular shape require that the stem-final consonant has certain properties. In order to account for generalizations of this sort, we need to establish morpheme boundaries. Segmentation is essentially the division of words into their constituent morphemes, i.e. establishing the relationships between words and the parts they consist of. In Cognitive Grammar, part-whole relationships are accounted for by means of Langacker's (1987: 75) integration relation (cf. section 2.6). In Figure 4.4, I represent the structure of

37 As mentioned in chapter 1, I use the term "morpheme" as a cover term for roots and affixes. This usage, however, does not imply any particular position in the long-standing issue concerning the relative merits of morpheme-based models and realizational frameworks (Matthews 1972, Anderson 1992, Aronoff 1994, Stump 2001). A discussion of these frameworks is beyond the scope of this book.

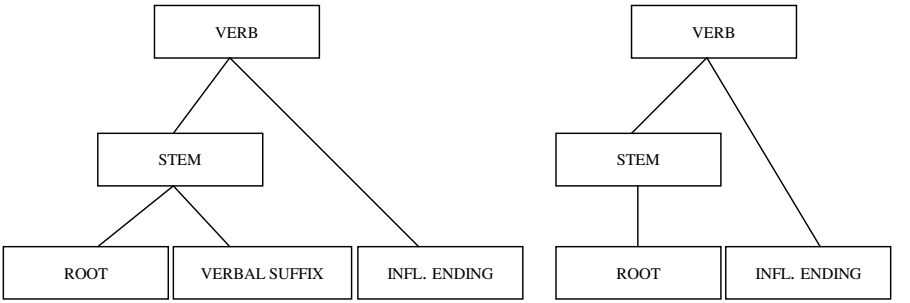

Figure 4.4. The structure of Russian verbs

two (non-prefixed) Russian verbs.[38] The diagram to the left represents forms with a verbal suffix, whereas the diagram to the right accommodates forms that lack a verbal suffix. Examples of suffixed and non-suffixed verbs will be given in the following section.

The flexibility of cognitive linguistics with regard to segmentation has been shown to involve several advantages, e.g. in the analysis of Norwegian verbs (Gundersen 2001, see also Bybee 1988: 127–129 for general discussion of segmentation problems). In chapter 6 of the present book, we shall see that Cognitive Grammar accommodates an apparent segmentation paradox. In order to capture a generalization about the infinitive of Russian verbs we need to refer to morpheme boundaries, but at the same time it is impossible to segment the infinitive in a principled way. In section 11.2, it will be argued that cognitive linguistics' flexible approach to segmentation facilitates an analysis of the interaction of the truncation and softening alternations, which conspire to convey non-past meaning.[39]

4.5. Verb inventory

As shown in Figure 4.4 above, Russian verb stems may consist of a root and a verbal suffix, or a bare root. We may call verbs with stems of the former type "suffixed" and the latter "non-suffixed". A full list of the suffixes is given in Table 4.2, where roots and verbal suffixes are separated by a hyphen, and suffixes

38 Russian verbs combine with a wide array of prefixes, but in this book I shall not discuss them, because they do not bear on the stem alternations that are the topic of the book.

39 It is worth mentioning that Cognitive Grammar is not alone in downplaying the role of segmentation in morphological analysis (Blevins 2006).

Table 4.2. Derivational suffixes (productive patterns in boldface)

Suffix:	Alternation:	Example (3 pl present ~ M sg past):	Gloss:
aj	**aj ~ a**	**igr-áj+ut ~ igr-á+l**	***igrat'*** **'play'**
ej	**ej ~ e**	**krasn^{j}-éj+ut ~ krasn^{j}-é+l**	***krasnet'*** **'redden'**
vaj	j ~ vaj ~ va	da-j+út ~ da-váj ~ da-vá+l	*davat'* 'give'
nu	**n ~ nu**	**max-n+út ~ max-nú+l**	***maxnut'*** **'wave'**
nu	n – nu – Ø	sóx-n+ut ~ sóx-(nu+l)	*soxnut'* 'dry'
a	Ø ~ a	p^{j}íṣ+ut ~ p^{j}is-á+l	*pisat'* 'write'
e	Ø ~ e	smótr^{j}+at ~ smatr^{j}-é+l	*smotret'* 'look'
o	Ø ~ o	kól^{j}+ut ~ kal-ó+l	*kolot'* 'stab'
i	**Ø ~ i**	**gavar^{j}+át ~ gavar^{j}-í+l**	***govorit'*** **'speak'**
ava	**uj ~ ava**	**abraz-új+ut ~ abraz-avá+l**	***obrazovat'*** **'form'**

and inflectional endings by a + sign. The suffixes are given in the form they have in stressed position. Productive patterns are boldfaced. As shown in the table, the suffixes are engaged in alternations; they have different shapes depending on the environment. In the leftmost column I list the longer alternant, which I shall use as the reference form. When I mention the suffix [aj], for instance, I mean the suffix that has an [aj] ~ [a] alternation. The table contains one example of each alternant of each suffix. The alternant to the left is the 3 plural present tense. It represents the present tense and imperative subparadigms where the inflectional endings are vowel-initial. The last alternant is the masculine singular past tense. It represents the past tense and infinitive subparadigms, which have consonant-initial inflectional endings.

If we take the reference forms of the suffixes given in the leftmost column in Table 4.2 as our point of departure, it is possible to make some generalizations about the form of the suffixes. All verbal suffixes end in [j] or a vowel. With the exception of [nu], all suffixes are vowel-initial. The table does not give any information about the meaning of the suffixes. It is hard to pinpoint the semantic contribution of some of the suffixes, and in any case their meanings are not of relevance for the topic of this book.

It is necessary to distinguish between two [nu] suffixes. Verbs with the non-productive [nu] may lack the suffix in the past tense according to complex rules beyond the scope of this book (see, however, Nesset 1998a: 126–149 for discussion). The non-productive and productive [nu] also differ semantically. The latter form verbs with semelfactive (punctual) Aktionsart, while the non-productive suffix forms intransitive verbs, many of which have inchoative meaning. For

ease of reference, verbs with the non-productive suffix will sometimes be referred to as "nu-drop verbs" because of the absence of [nu] in the past tense forms.

In addition to the non-productive nu-drop verbs, one suffix is involved in a tripartite alternation. The [vaj] suffix has the form [j] in the present tense and [va] in the past tense. The [vaj] allomorph occurs in the imperative; the imperative singular [davái] 'give' is provided as an example in the table.

The non-productive suffixes [a], [nu] and [e] form large classes. The Academy Grammar lists about 135 non-prefixed verbs with the [a] suffix (Švedova (ed.) 1980: 653–655). There are about 60 non-prefixed nu-drop verbs (all of which are listed in section 7.2), and more than 40 non-prefixed verbs with the suffix [e] (Švedova (ed.) 1980: 660–661). The suffixes [o] and [vaj] are marginal. The [o] suffix is only attested in the five simplex verbs *borot'sja* 'fight', *kolot'* 'stab', *molot'* 'grind', *polot'* 'weed' and *porot'* 'flog', and the [vaj] suffix occurs only in three verb stems, two of which are not attested without prefixes: *davat'* 'give', *(u)znavat'* 'find out' and *(u)stavat'* 'get tired'.

The non-suffixed verbs constitute non-productive patterns. Not counting prefixations, there are altogether about 60 verbs of this type in Russian (Švedova (ed.) 1980: 657–663). They combine with several prefixes to form frequent verbs that belong to the basic vocabulary, so the non-suffixed verbs cannot be ignored in an adequate analysis of Russian. Many classifications of the non-suffixed verbs are possible. For our purposes, the most important parameter is whether the stem ends in a sonorant or an obstruent consonant in the present tense. (There are no examples of vowel-final stems among non-suffixed verbs.) Table 4.3 provides examples for each attested consonant in stem-final position. In order to get a handle on the different stem alternations, it is necessary to consider three forms: 3 plural present tense, feminine singular past tense and infinitive, which are given in this order in the table. As can be seen from the table, stem-final sonorants are generally not attested in the past tense or infinitive. Obstruents, on the other hand, are generally kept intact in the past tense, but neutralize to [s^{j}] in the infinitive. There are some systematic exceptions to these general patterns, though. First, non-syllabic stems in sonorants have consonant ~ vowel alternations, as shown by *pit'* 'drink', *žat'* 'reap' and *žat'* 'press' in the table. Second, the stems in the vibrant [r] resemble obstruent stems in that they maintain the stem-final consonant in the past, but differ in having an additional [e] between the root and the ending in the infinitive. Third, stems in the alveolar plosives [t] and [d] lack the consonant in (parts of) the past tense subparadigm.

Table 4.3. Non-suffixed verbs classified according to stem-final consonant

Stem-final C:		Alternation:	Example (3 pl present ~ F sg past ~ inf):	Gloss:
Sonorants:	j	j ~ Ø ~ Ø	dúj+ut ~ dú+la ~ du+tʲ	*dut'* 'blow'
		j ~ i ~ i	pʲj+ut ~ pʲi+lá ~ pʲi+tʲ	*pit'* 'drink'
	n	n ~ Ø ~ Ø	stán+ut ~ stá+la ~ sta+tʲ	*stat'* 'become'
		n ~ a ~ a	zn̨+ut ~ zą́+la ~ zą+tʲ	*žat'* 'reap'
	m	m ~ a ~ a	zm̨+ut ~ zą́+la ~ zą+tʲ	*žat'* 'press'
	v	v ~ Ø ~ Ø	zi̯v+út ~ zi̯+lá ~ zi̯+tʲ	*žit'* 'live'
	r	r ~ r ~ rʲe	tr+ut ~ tʲór+la ~ tʲirʲé+tʲ	*teret'* 'rub'
Obstruents:	b	b ~ b ~ sʲ	grʲib+út ~ grʲib+lá ~ grʲisʲ+tʲí	*gresti* 'row'
	t	t ~ Ø ~ sʲ	mʲit+út ~ mʲi+lá ~ mʲisʲ+tʲí	*mesti* 'sweep'
	d	d ~ Ø ~ sʲ	vʲid+út ~ vʲi+lá ~ vʲisʲ+tʲí	*vesti* 'lead'
	s	s ~ s ~ sʲ	nʲis+út ~ nʲis+lá ~ nʲisʲ+tʲí	*nesti* 'carry'
	z	z ~ z ~ sʲ	vʲiz+út ~ vʲiz+lá ~ vʲisʲ+tʲí	*vezti* 'transport'
	k	k ~ k ~ tʃʲ	valak+út ~ valak+lá ~ valótʃʲ	*voloč'* 'drag'
	g	g ~ g ~ tʃʲ	móg+ut ~ mag+lá ~ motʃʲ	*moč'* 'be able'

4.6. The truncation alternation

As mentioned in chapter 1, in this book I focus on the conspiracy of two sets of alternations, which I shall refer to as "the truncation alternation" and "the softening alternation". On the basis of the introduction of Cognitive Grammar in chapter 2 and the sketches of Russian phonology (chapter 3) and verb morphology (this chapter), we now turn to a more detailed presentation of the truncation and softening alternations. This section is about the truncation alternation, while the next is devoted to the softening alternation.

The truncation alternation is a cover term for two alternations occurring in stem-final position in Russian verbs. Consider the following examples where – stands for the boundary between a root and a suffix, while + represents the boundary between stem and inflectional ending:

(1) a. C ~ Ø: [igr-áj+it] '(s/he) plays' ~ [igr-á+l] '(he) played'
[dúj+it] '(s/he) blows' ~ [dú+l] '(he) did'
b. Ø ~ V: [pʲíṣ+it] '(s/he) writes' ~ [pʲis-á+l] '(he) wrote'

The example *igrat'* 'play' in (1a) shows that if a suffix ends in a consonant in the present tense, this consonant is absent in the past tense. The second example

40 In order to illustrate the tripartite alternation in the suffix [vaj], the table contains the imperative singular [daváj] in addition to the 3 plural present tense and the masculine singular past tense of *davat'* 'give'.

in (1a), *dut'* 'blow' shows that the same happens for non-suffixed stems; the stem-final consonant in the present tense does not occur in the past tense. The example in (1b) represents verbs where a vowel in stem-final position in the past tense does not occur in the present tense. This type of alternation is only attested in suffixed verbs.

In a pioneering article, Jakobson (1948) used the term "truncation" to describe this alternation, and this term has gained wide acceptance in Slavic linguistics. Jakobson accounted for the alternations by means of procedural rules applying to underlying representations; "truncation" refers to the shortening of the underlying stem by one such rule. However, the term is potentially misleading in the context of this book. As we have seen above, Cognitive Grammar does not have underlying representations or procedural rules, so there is nothing in Cognitive Grammar that corresponds directly to the Jakobsonian truncation rule. However, I did not want to confuse readers with background in Slavic linguistics by coining a new term for a phenomenon that is well described in the literature. For the purposes of this book, I shall therefore use the term "truncation alternation". By using "truncation" readers well versed in Slavic linguistics will be able to identify the phenomenon under scrutiny without problems. By adding "alternation", I hope to make clear that I do not refer to a procedural rule (i.e. an aspect of a linguistic framework), but rather to the data observable in the language, which this rule was meant to account for.

Why write a book about the truncation alternation, and – more importantly – why read it? First of all, although the alternations in (1) may seem straightforward, describing the environment that conditions the alternation is a complex task. Is the truncation alternation conditioned by the shape of the following inflectional ending or by morphological features characterizing the forms displaying the alternation? Both approaches have been advocated in the literature. In this book I shall argue that the question is wrongly stated. We should not choose either meaning or form, but rather incorporate both aspects in the analysis (cf. section 5.4).

This takes us to the second point. In incorporating both meaning and form, the analysis I advocate in this book represents a synthesis between two approaches that are known as the "one-stem" and "two-stem systems". In this way I contribute to a long-standing issue in Slavic linguistics. Hopefully, this study will provide a basis for a more fruitful discussion between adherents of each system.

A third reason to write (and read) this book is the fact that the truncation alternation provides excellent material for testing Cognitive Grammar against complex data. Not only is it a challenge to account for the main pattern (to be discussed in chapter 5), but the systematic exceptions from this pattern give us opportunities to explore complex phenomena like neutralization and merger

(chapter 6), alternatives to rule ordering (chapter 7), and opaque rule interaction (chapter 8). All these phenomena are of general theoretical relevance, and seeing how they can be addressed in Cognitive Grammar may be interesting both for cognitive linguists and for linguists of other persuasions.

A fourth point concerns the relationship between the truncation alternation and softening. As mentioned in chapter 1, I shall argue in this book that the two alternations conspire as markers of meaning. Scrutinizing the truncation alternation is therefore a necessary prerequisite for a proper understanding of softening – the alternation we now turn to.

4.7. The softening alternation

The softening alternation is a cover term for two sets of alternations. Again I add "alternation" to emphasize that the term refers to observable data, not to an analysis of these data by means of abstract underlying representations and procedural rules. Examples of the simplest softening alternation, traditionally called "plain softening", are given in Table 4.4. Although this is a book about verbs, the examples are from nouns. Because only a subset of the alternations is attested in conjugation, nouns provide a better basis for discussion. For each alternation I distinguish between a "standard" and a "target", where the latter is the segment that displays softening. The alternations in Table 4.4 may be divided into five subtypes. Subtype 1 concerns alternations between plain labial or alveolar consonants and their palatalized counterparts. Subtype 2 subsumes cases where palatalized consonants "alternate" with themselves. Whether one considers such cases alternations is a terminological issue, but for the sake of completeness I include them in the table.[41] The third subtype regards the palatal sonorant [j], which "alternates" with itself. Subtype 4 concerns alternations between the velar obstruents [k, g, x] and their palatal counterparts [c, ɟ, ç], while the alternations of type 5 are between the velarized [l^{ɣ}] and the palatalized [l^{ʲ}]. As can be seen from the leftmost column in the table, the standard of the plain softening alternation may or may not have a palatal primary or secondary place of articulation. What unites all the alternations in Table 4.4 is the fact that the target is always palatal or palatalized. In other words, the target has the feature [palatal] as its primary or secondary place of articulation. While most Russian consonants are involved in the plain softening alterna-

41 Zaliznjak (1977) does not give examples with palatalized labial consonants as standards in the nominative∼locative alternation. These consonants are therefore not included under subtype 2 in the table.

Table 4.4. The plain softening alternation

Standard		Target	Nominative	Locative	Gloss
1.	Plain	Palatalized			
	t	tʲ	svʲet	svʲétʲ-i	*svet* ‘light’
	d	dʲ	mód-a	módʲ-i	*moda* ‘fashion’
	s	sʲ	nos	nósʲ-i	*nos* ‘nose’
	z	zʲ	váz-a	vázʲ-i	*vaza* ‘vase’
	r	rʲ	vor	vórʲ-i	*vor* ‘thief’
	n	nʲ	ton	tónʲ-i	*ton* ‘tone’
	p	pʲ	sup	súpʲ-i	*sup* ‘soup’
	b	bʲ	zą́b-a	zą́bʲ-i	*žaba* ‘toad’
	f	fʲ	mʲif	mʲífʲ-i	*mif* ‘myth’
	v	vʲ	sláv-a	slávʲ-i	*slava* ‘glory’
	m	mʲ	dom	dómʲ-i	*dom* ‘house’
2.	Palatalized	Palatalized			
	tʲ	tʲ	tʲótʲ-a	tʲotʲ-i	*tetja* ‘aunt’
	dʲ	dʲ	dʲádʲ-a	dʲádʲ-i	*djadja* ‘uncle’
	sʲ	sʲ	gusʲ	gúsʲ-i	*gus’* ‘goose’
	zʲ	zʲ	zʲúzʲ-a	zʲúzʲ-i	*zjuzja* ‘drunk’
	rʲ	rʲ	búrʲ-a	búrʲ-i	*burja* ‘storm’
	nʲ	nʲ	bánʲ-a	bánʲ-i	*banja* ‘bath-house’
	tʃʲ	tʃʲ	tútʃʲ-a	tútʃʲ-i	*tuča* ‘cloud’
	ʃʲ:	ʃʲ:	tʲóʃʲ:-a	tʲóʃʲ:-i	*tešča* ‘mother-in-law’
3.	Palatal	Palatal			
	j	j	tramváj	tramváj-i	*tramvaj* ‘streetcar’
4.	Velar	Palatal			
	k	c	sok	sóc-i	*sok* ‘juice’
	g	ɟ	knʲíg-a	knʲíɟ-i	*kniga* ‘book’
	x	ç	dux	dúç-i	*dux* ‘spirit’
5.	Velarized	Palatalized			
	lˠ	lʲ	zalˠ	zálʲ-i	*zal* ‘hall’

tion, the alternation is blocked for the segments [ts, ʂ, zʐ]. These consonants remain hard even in environments that require the target of the plain softening alternation.

In section 3.8, we saw that the plain softening alternation is phonologically conditioned before [e] and in certain consonant clusters. In these phonologically defined environments, only the soft alternant is attested, so the opposition between hard and soft consonants is neutralized. However, the examples from Russian verbs under scrutiny in this book are more complex and cannot be accounted for in purely phonological terms. In chapter 10, we shall see that Cognitive Grammar facilitates an insightful analysis based on the shape of the stem, as well as the shape and meaning of the inflectional endings.

The second type of softening alternation is often referred to as "transitive softening".[42] The relationship between the standard and target in the transitive alternation is more complex than in the case of the plain softening alternation. Let us start with labial standards, which alternate with the relevant non-palatalized labial followed by the palatalized lateral [l^{j}], as can be seen from Table 4.5. In other words, for labials transitive softening involves adding a palatalized lateral. The examples in the table involve the infinitive and 1 sg present tense of verbs. I am not aware of any verbs with the alternations [v] ~ [vl^{j}] or [f] ~ [fl^{j}], but these are clearly accidental gaps.

Table 4.5. The transitive softening alternation (labials)

Standard	Target	Infinitive	1.sg pres	Gloss
b	bl^{j}	kal^{j}ibá+t^{j}	kal^{j}ébl^{j}+u	*kolebat'* 'vacillate'
b^{j}	bl^{j}	l^{j}ub^{j}í+t^{j}	l^{j}ubl^{j}+ú	*ljubit'* 'love'
v^{j}	vl^{j}	lav^{j}í+t^{j}	lavl^{j}+ú	*lovit'* 'catch'
m	ml^{j}	dr^{j}imá+t^{j}	dr^{j}iml^{j}+ú	*dremat'* 'slumber'
m^{j}	ml^{j}	karm^{j}í+t^{j}	karml^{j}+ú	*kormit'* 'feed'
p	pl^{j}	spá+t^{j}	spl^{j}+u	*spat'* 'sleep'
p^{j}	pl^{j}	kup^{j}í+t^{j}	kupl^{j}+ú	*kupit'* 'buy'
f^{j}	fl^{j}	graf^{j}í+t^{j}	grafl^{j}+ú	*grafit'* 'rule (paper)'

Standards that are lingual (i.e. non-labial) obstruents alternate with targets that are post-alveolar affricates or fricatives (or, marginally, the segment cluster [z̪d(ʲ)]), as shown in Table 4.6. Notice that the alternative targets given in parentheses are due to Church Slavic influence. They enjoy a somewhat peripheral status in Contemporary Standard Russian, and will not be discussed in this book.

42 Transitive softening is a misnomer, but is employed here since it is a traditional term widely used in the literature. It has nothing to do with transitivity in verbs. Alternative terms are "substitutive" (Jakobson 1948) and "mutational" (Andersen 1995: 20).

Table 4.6. The transitive softening alternation (lingual obstruents)[43]

Standard	Target	Infinitive	1.sg pres	Gloss
g	z̨	dvʲíga+tʲ	dvʲíz̨+u	*dvigat'* 'move'
d	z̨	gladá+tʲ	glaz̨+ú	*glodat'* 'gnaw'
	(z̨d)	(stradá+tʲ	stráz̨d+u	*stradat'* 'suffer')
dʲ	z̨ (z̨dʲ)[44]	xadʲí+tʲ	xaz̨+ú	*xodit'* 'walk'
z	z̨	máza+tʲ	máz̨+u	*mazat'* 'grease'
zʲ	z̨	vazʲí+tʲ	vaz̨+ú	*vozit'* 'transport'
s	ʂ	pʲisá+tʲ	pʲiʂ+ú	*pisat'* 'write'
sʲ	ʂ	brósʲi+tʲ	bróʂ+u	*brosit'* 'throw'
x	ʂ	maxá+tʲ	maʂ+ú	*maxat'* 'wave'
k	tʃʲ	pláka+tʲ	plátʃʲ+u	*plakat'* 'weep'
t	tʃʲ	prʲáta+tʲ	prʲátʃʲ+u	*prjatat'* 'hide'
	(ʃʲ:)	(klʲivʲitá+tʲ	klʲivʲiʃʲ:+ú	*klevetat'* 'slander')
tʲ	tʃʲ	krutʲí+tʲ	krutʃʲ+ú	*krutit'* 'twist'
	(ʃʲ:)	(asvʲitʲí+tʲ	asvʲiʃʲ:+ú	*osvetit'* 'illuminate')
sk	ʃʲ:	iská+tʲ	iʃʲ:+ú	*iskat'* 'seek'
st	ʃʲ:	xlʲistá+tʲ	xlʲiʃʲ:+ú	*xlestat'* 'whip'
ʒg	ʒʲ:	brízga+tʲ	bríʒʲ:+u	*bryzgat'* 'sprinkle'

For a detailed analysis of this phenomenon, the interested reader is referred to Itkin (2007: 137–146).

Finally, we turn to the transitive softening alternation in lingual sonorants in Table 4.7. Comparison with Table 4.4 shows that the opposition between plain and transitive softening is neutralized for this class of sounds. I shall refer to the alternations as "plain softening" when they occur in the same environment as the alternations in table 4.4, and as "transitive softening" when they occur in the same environments as those in Tables 4.5 and 4.6. Notice that for the sake of completeness in table 4.7 I include palatal(ized) standards, although in these cases the "alternation" involves two identical segments. The reason for

43 In addition to the alternations shown in this table, the alveolar affricate [ts] alternates with the post-alveolar affricate [tʂʲ], but as this alternation is not attested in verb inflection it is not included in the table and will not be discussed in this study. An example is the augmentative form *kupčina* of *kupec* 'merchant'.

44 The target [z̨dʲ] is attested in the past passive participle of some verbs, e.g. *rodit'* 'give birth' with the 1 singular present tense [raz̨+ú] and the past passive participle [raz̨dʲ+ón].

Table 4.7. The transitive softening alternation (lingual sonorants)

Standard	Target	Infinitive	1.sg pres	Gloss
r	r^{j}	paró+t^{j}	par^{j}+ú	*porot'* 'flog'
r^{j}	r^{j}	gavar^{j}í+t^{j}	gavar^{j}+ú	*govorit'* 'speak'
l^{x}	l^{j}	kaló+t^{j}	kal^{j}+ú	*kolot'* 'chop'
l^{j}	l^{j}	pazvól^{j}i+t^{j}	pazvól^{j}+u	*pozvolit'* 'allow'
n^{j}	n^{j}	zvan^{j}í+t^{j}	zvan^{j}+ú	*zvonit'* 'call'
j	j	tája-t^{j}	táj+u	*tajat'* 'melt'

including them is that palatalized standards in general participate in transitive softening, as can be seen from Tables 4.5 and 4.6. The non-palatalized nasal is not attested in transitive softening in Russian conjugation; verbs with [n] in the stem display plain softening. This applies to verbs with the two [nu] suffixes, as well as non-suffixed verbs with a root-final [n] (e.g. *stat'* 'become') and the isolated *stonat'* 'moan'.

The transitive softening alternation involves neutralization in two ways. As can be seen from Tables 4.5–4.7, the targets tend to have a palatal secondary place of articulation. In other words, the opposition between soft and hard consonants is neutralized in the environments that condition transitive softening. Admittedly, the segments [ʂ, ʐ] are a complicating factor. Although these segments are not palatal(ized), they occur as targets of transitive softening, a problem we shall return to in chapter 9. In addition to showing neutralization of the opposition between hard and soft consonants, transitive softening also provides an example of neutralization of the opposition between alveolar, post-alveolar and dorsal obstruents. As shown in Table 4.6, for obstruents only post-alveolar consonants are attested as targets of transitive softening.

As opposed to the truncation alternation, the softening alternation is not restricted to verbs. However, in this book we shall be concerned with verbs only, where the truncation and softening alternations occur in similar, but not identical domains. As explained in the previous section, the truncation alternation is attested in stem-final position in verbs. The plain softening alternation also targets consonants in stem-final position. Notice, however, that a consonant can occur in this position due to the truncation alternation. The 3 singular present tense [sóx-n^{j}+it] of *soxnut'* 'dry' is a case in point. In this verb, the vowel in the [nu] suffix is absent because of the truncation alternation. As a result of this, the nasal occurs in stem-final position, where it is targeted by the plain softening alternation. The transitive softening alternation occurs in *root*-final position, but only when the root-final consonant is at the same time in stem-final position.

There are two ways a root-final consonant can end up in stem-final position. First, the verb may be non-suffixed, in which case the stem consists of a bare root. An example of this is the 3 singular present tense [pʲitʃʲ+ót] of *peč'* 'bake', where the root- and stem-final [tʃʲ] is the target of plain softening. Secondly, a root-final consonant can be stem-final as a result of the truncation alternation. In forms where a vocalic suffix alternates with Ø (zero), the root-final consonant ends up in stem-final position. An example is the 3 singular present tense [pʲíʂ+it] of *pisat'* write', where [ʂ] show transitive softening in root- and stem-final position.

There are several questions concerning the softening alternation that are of interest for cognitive linguistics. First of all, an adequate analysis must clarify the relationship between the standard and the target. Is it possible to do that by means of schemas? In the case of the plain softening alternation, the relationship is fairly straightforward, while the transitive softening alternation is much more complex. However, in chapter 9 I shall argue that second-order schemas enable us to capture the relevant generalizations. Part of the complexity derives from the fact that the transitive softening alternation combines lenition and palatalization. Once these phenomena are kept apart, an insightful analysis in terms of schemas is possible, as shown in sections 9.2 and 9.3.

The second issue any analysis of the softening alternation must address is the environment conditioning the alternation. This is a complex question, especially because it involves phonological opacity (cf. section 3.6). However, in chapter 10 we shall see that an analysis in terms of second-order schemas is not only viable, but also has important ramifications. It implies that phonological opacity boils down to basic-derived relations between morphological forms, which can be represented as second-order schemas. In other words, phonological opacity is a morphological phenomenon. This summarizes my approach to what has traditionally been called "abstract phonology". While such phenomena may have a phonological basis, which can be explicated in terms of schemas, "abstract phonology" is most insightfully analyzed in morphological terms. Not only is the softening alternation conditioned by morphological features (cf. chapter 10), the alternation is also recruited to convey grammatical meaning (cf. chapter 11).

4.8. Summarizing this chapter

In sections 4.1 through 4.4 we saw how Cognitive Grammar accommodates fundamental concepts in morphology like root, stem, derivational suffixes, inflectional endings, inflectional paradigms, inflectional class, and segmentation. Two points are important. First, it was shown that these notions can be accounted for in terms of a small set of theoretical constructs that all have a cognitive mo-

tivation. Second, the relevant constructs are the same as those employed in phonological analysis (cf. chapter 3), thus indicating that morphological and phonological phenomena are special cases of the same general cognitive phenomena.

After a brief introduction to the verb inventory of Russian in section 4.5, I presented the truncation and softening alternations (sections 4.6–4.7). In the remainder of this book we shall see how the theoretical machinery developed in chapters 2 through 4 facilitate a restrictive and insightful analysis of the two alternations, specifying the relationship between the alternants, the environment conditioning the alternations, as well as how the alternations conspire to convey meaning.

Chapter 5
Alternations in Cognitive Grammar: The truncation alternation and the one-stem/two-stem controversy

The aim of this chapter is to develop a theory of alternations in Cognitive Grammar based on an analysis of the truncation alternation. It is argued that an adequate theory must address three issues: (a) the nature of the relationship between the alternants, (b) the environment conditioning the alternation, and (c) the role of the alternation in the language system as a whole. Cognitive Grammar affords straightforward accounts of these issues in terms of structured networks of (second-order) schemas. No extra, ad hoc apparatus is required, not even for analysis of central vs. peripheral patterns and productive vs. non-productive alternations.

The analysis of the environment that conditions the truncation alternation is of particular interest: Is the alternation conditioned by the shape of the following inflectional ending or by the meaning of the forms displaying the alternation? Both approaches have been advocated in the literature. I argue that the question is wrongly stated. We should not focus on either pole (form or meaning) of the symbolic relationship to the exclusion of the other, but rather incorporate both poles in the analysis. In this chapter, I show how this can be done in Cognitive Grammar. After an introduction to the cognitive approach to alternations in section 5.1, I discuss form-based generalizations in section 5.2 and argue that they can be accommodated in Cognitive Grammar in section 5.3. Section 5.4 considers meaning-based generalizations, demonstrating how Cognitive Grammar can account for both meaning and form by means of bipolar schemas. Additional evidence in support of the approach is explored in sections 5.5 and 5.6, before the contribution of the analysis is summarized in section 5.7.

In addition to addressing theoretical problems pertinent to analysis of the truncation alternation in Cognitive Grammar, this chapter contributes to a long-standing issue in Slavic linguistics. Ever since Jakobson (1948) advanced his "One-Stem System" for the description of Russian conjugation, Slavists have debated the relative merits of this approach compared to the more traditional "Two-Stem System". I suggest that the merits of the two systems cannot be assessed unless one distinguishes clearly between descriptive generalizations on the one hand and theoretical assumptions pertaining to the linguistic models that accommodate the generalizations on the other (section 5.2). It will be argued that

the differences between the two systems in part concern theoretical assumptions, but also that they involve different descriptive generalizations. I will show that these generalizations complement each other rather than conflict (sections 5.3–5.4). Insofar as Cognitive Grammar enables us to capture generalizations from both systems, it provides a synthesis of the One-Stem and Two-Stem Systems.

5.1. Alternations in Cognitive Grammar

5.1.1. Relating the alternants

In this section, I will explore two questions pertaining to the relationship between the alternants. First, is the relationship symmetrical or asymmetrical? Second, what are the similarities and differences between the alternants? Let us discuss the first question first. Consider the [aj]~[a] alternation in verbs like *delat'* 'do', where the stem in the present tense and imperative subparadigms is [dʲélaj], while the past tense and infinitive subparadigms have the stem [dʲéla] without the final [j]. Cognitive Grammar predicts three possible schemas for situations like this. In the schema to the left in Figure 5.1 the dashed arrow leads from [aj] to [a], i.e. the longer alternant is the standard and the shorter the target of the extension relation. In the schema in the middle, the standard-target arrangement is reversed: the dashed arrow points at the longer alternant. While both the leftmost and middle schemas represent asymmetric relationships, the schema to the right depicts a symmetric relationship as shown by the double-headed arrow. In asymmetric relationships one of the alternants (the standard) is basic and the target is dependent on the standard, but in the case of symmetric relationships the alternants are mutually dependent on each other.

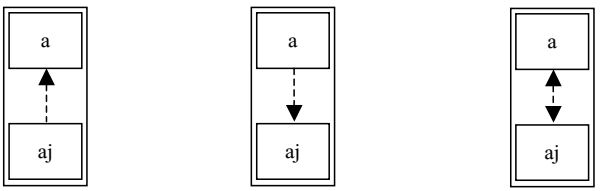

Figure 5.1. Asymmetrical and symmetrical alternations

Which of the schemas in Figure 5.1 offers the best analysis of the truncation alternation? Traditionally, the criterion for establishing the basic alternant is predictability: Pick the alternant that enables you to predict the shape of the other alternant(s) (cf. e.g. Bloomfield 1933: 212 and 218, Kenstowicz and Kisseberth

1979: 60f, Mel'čuk 2000: 126–134, Haslev 1972: 74–101). To see how this works, we need to compare the [aj]∼[a] alternation in *delat'* with other examples of the truncation alternation, Consider *stat'* 'become', where the stem in the present tense and imperative subparadigms is [stan], while the past tense and infinitive forms have the shorter stem [sta]. The alternations in *delat'* and *stat'* are parallel, because in both verbs the stem in the past tense and the infinitive lacks the final segment of the longer stem of the present tense and imperative forms. This has consequences for predictability. If we regard the longer alternant as basic, we are in a position to predict that the other alternant lacks the final consonant, but is otherwise identical to the basic alternant. From [dʲélaj] and [stan] one can derive [dʲéla] and [sta] deleting the final consonant. Importantly, however, the reverse is not true. If we take the shorter alternants as basic, there is no way to predict the shape of the longer alternant. We need to add a consonant to [dʲéla] and [sta], but which one? We cannot predict the fact that *delat'* has [j] and *stat'* [n]. This insight informed Jakobson's (1948) famous analysis of Russian conjugation where he chose the longer alternant as basic and devised a "truncation rule" that deleted the stem-final segment in certain environments.

Although the predictability criterion clearly favors the longer alternant as the basic alternant, there is a snag. Andersen (1980) considers evidence from language change and language acquisition that suggests that speakers take the stem of the past tense and infinitive as their basic alternant and add [j] in the present tense and the imperative subparadigms. In addition to verbs like *delat'*, Russian has another class of verbs with stem-final [a] in the past tense and infinitive subparadigms. In *maxat'* 'wave', for example, the stem of the past tense and infinitive is [maxá]. The present tense and imperative subparadigm has the stem [maṣ], but an alternative stem [maxáj] is gaining ground. As Andersen (1980) points out, this development is unexpected if one assumes that the speakers have internalized a Jakobsonian truncation rule where the stem in the past tense and infinitive [dʲéla] is formed by deleting the final consonant in the stem of the present tense and imperative forms [dʲélaj]. Rather, it seems that the speakers adopt the past tense and infinitive stem as their basic alternant and generalize a pattern whereby the stem in the present tense and imperative subparadigm is formed by the addition of [j]. The diachronic process is well documented from historical sources and stylistic variation in present-day Russian that reflect ongoing change. In addition, Andersen (1980) points out that overgeneralizations of the same type are attested in children's speech.[45]

45 Andersen (1980) based his argument on Gvozdev's (1949) longitudinal study of one child, but subsequent investigations provide further support for Andersen's analysis (Gagarina 2003, Gor and Chernigovskaya 2003a and 2003b).

The upshot of this discussion is that the predictability criterion favors the longer stem of the present tense and imperative as the basic alternant for verbs like *delat'*, while evidence from language change and language acquisition suggests that the shorter stem in the past tense and infinitive serves as the basic alternant. In a rule-based approach, this conflicting evidence is problematic, since only the basic alternant is stored in the lexicon, while the other alternant is derived by rule. In other words, adherents of rule-based approaches end up in an unenviable position where they are forced to choose either one or the other basic alternant, which implies a choice between full predictability and psychological reality.

This dilemma is less acute in Cognitive Grammar, because both alternants are part of the second-order schemas in the grammar. Figure 5.2 contains schemas for the addition of [j, v, n, m]. Although this is not sufficient to predict exactly which consonant is added in a given verb, the analysis delineates the set of relevant consonants to these four consonants. Furthermore, as we shall see later in this section, Cognitive Grammar enables us to represent the fact that addition of [j] is a productive pattern that affects a large number of verbs, while the competing patterns cover small and closed classes. In this way, we capture the motivation for the spread of the [j] pattern. Notice that the extension relations in Figure 5.2 lead from the shorter to the longer alternant. In this way we capture the idea that we are dealing with consonant addition, rather than deletion, as argued by Andersen (1980).

After this discussion of the (a)symmetry of alternations, we now turn to the second parameter that characterizes the relationship between the alternants. In addition to deciding whether the relationship is symmetrical or asymmetrical, we need to characterize the similarities and differences between the alternants in an alternation. As long as we are dealing with one alternation in isolation, this task may seem straightforward. In the case of the [aj]∼[a] alternation, for instance, the second-order schema clarifies that one alternant contains [j] which is absent in the other alternant. The task becomes more complex, however, when we consider a whole family of alternations such as all the variants of the truncation alternation. In order to capture generalizations of this type, we need category networks like those in Figures 5.2 and 5.3.

Figure 5.2 concerns alternations that involve the addition of a consonant in the present tense and imperative subparadigm. For convenience, an example is given under each schema in the lower portion of the diagram. The examples are the same as in Tables 4.2 and 4.3 in section 4.5, which may be consulted for more detailed information about the alternations in question. The Figure shows that the alternations form various groups. We shall focus on the four schemas at the top, which express broad generalizations about the relationship between the

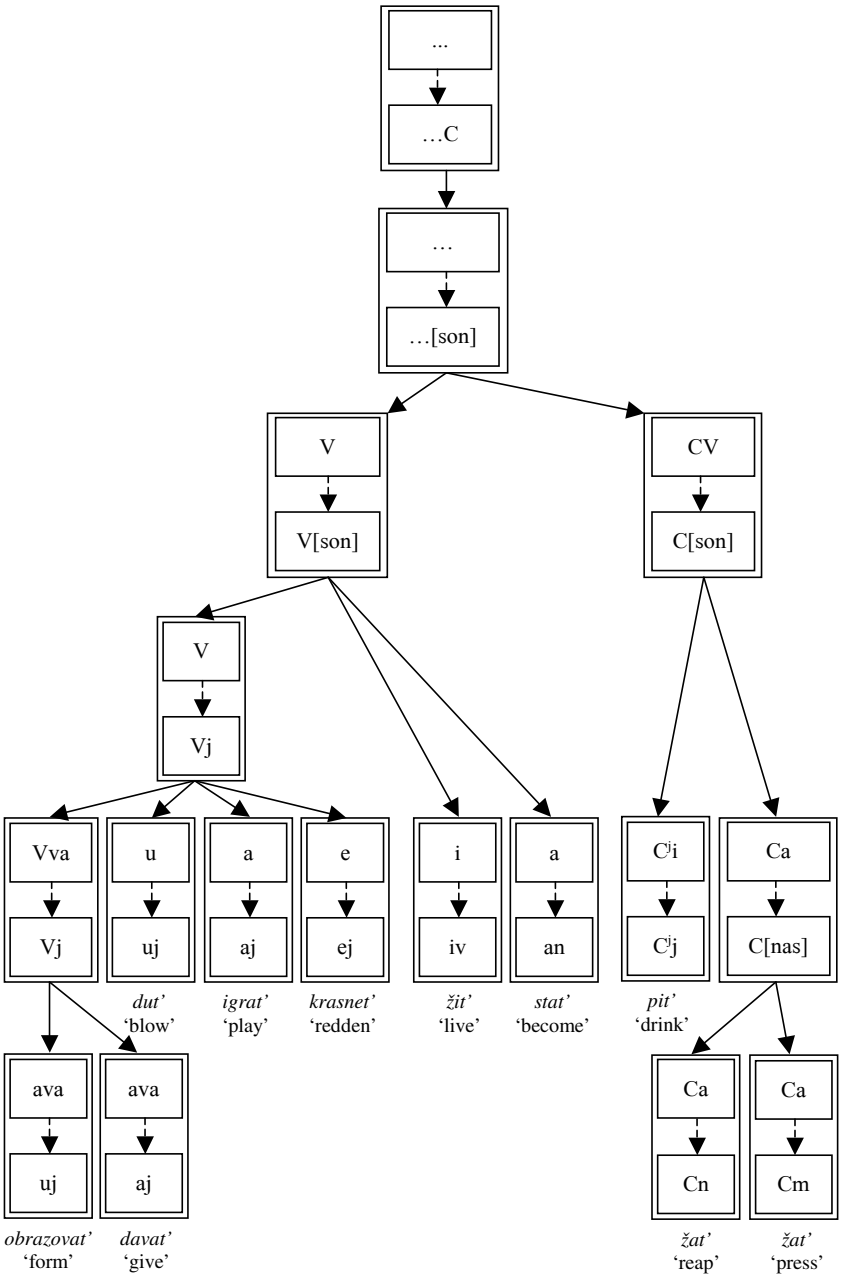

Figure 5.2. Category network for V ~ VC alternations

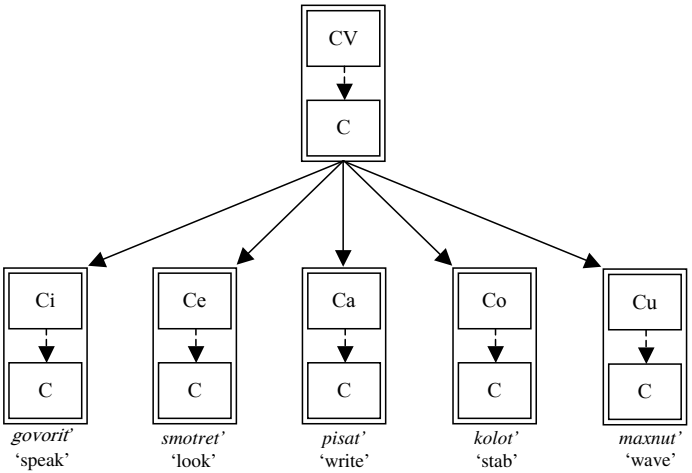

Figure 5.3. Category network for CV ~ C alternations

alternants. The leftmost schema in the third row from the top covers alternations of the type V∼V[sonorant] where a V-final stem is extended by a sonorant consonant. The schema to the right in the third row from the top also involves the addition of a consonant, but here the alternation is of the type CV∼C[sonorant]. Here the added sonorant *replaces* the vowel in the stem. The more general schema in the second row from the top captures the generalization that all the truncation alternations in the figure involve the addition of a sonorant. The topmost schema is included in order to highlight the fact that all the alternations concern consonants, which set them apart from the alternations in Figure 5.3, which focuses on vowels. Although the topmost schema is very general, we shall see in section 7.1 that there is some evidence for adopting this schema as a global default.

Figure 5.3 is less complex than Figure 5.2. I assume five schemas in the lower portion of the diagram – one for each phonemic vowel. The examples under the schemas correspond to those presented in Tables 4.2 and 4.3 in section 4.5, which provide more detailed information about the alternations. All the alternations involve deleting the stem-final vowel in the present tense and imperative forms.[46] This generalization about the relation between the alternants is captured in the topmost schema. We can conclude that categorization networks enables us to capture the relationship between the alternants.

46 In all the alternations, the alternating vowel is preceded by a consonant. We shall return to the quality of this consonant in chapter 9, which explores the softening alternation.

5.1.2. Conditioning environment

How can we characterize the environment that conditions an alternation? In the case of the truncation alternation this question is quite complex and will be considered in great detail in sections 5.2 through 5.6. However, at this point a simple example is sufficient as a general illustration. As we shall see in section 5.2, stems have C-final allomorphs before V-initial endings, as in [dʲélaj+u]. Figure 5.4 offers two alternative accounts of this generalization. The schema to the left, where the + sign represents the boundary between stem and ending, captures the co-occurrence of C-final stems and V-initial endings. Often, this simple formula is sufficiently precise, but as pointed out in section 3.4 it does not clarify the dependency relationship between stem and ending. Is it the C-final stem that selects a V-initial ending, or is it the other way around? In order to capture the generalization that it is in fact the ending that selects the stem we need the expanded format to the right in Figure 5.4. This schema consists of three boxes, which represent the stem, ending and the word as a whole. As in section 2.6, the integration relation connecting the parts (i.e. stems and endings) with the wholes (the words) is represented by a solid line. The ending begins with a vowel and is preceded by an elaboration site represented as suspension points included in a circle. This tells us that the ending requires a preceding stem. The dashed correspondence line shows that the stem in question is of the C-final type. In this way, we capture the generalization that a V-initial suffix selects for a C-final stem.

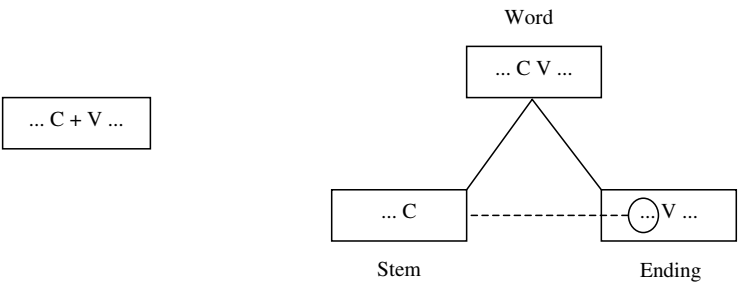

Figure 5.4. Schemas for C-final stem before V-initial ending

As pointed out in Langacker's (1987) content requirement cited in section 2.2, Cognitive Grammar accepts three types of schemas: phonological, semantic and symbolic. Since the conditioning environment for alternations is represented as schemas, it follows that the environment can be phonological, semantic or symbolic. Phonologically conditioned alternations correspond to what has traditionally been referred to as "automatic alternations" (Bloomfield 1933: 211), where

the environment can be described in terms of form alone. Automatic alternations are often contrasted with morphologically conditioned alternations. In principle, such alternations can be of two types. Either an alternant co-occurs with a semantic feature, say, "present tense", or it is conditioned by a combination of a semantic and a phonological property, e.g. "present tense" and "V-initial". In Cognitive Grammar, we may call the former type "semantic conditioning" and the latter "symbolic conditioning". Later in this chapter it will be argued that the truncation alternation is of the symbolic type.

Two properties of the proposed account deserve mention at this stage. First, Cognitive Grammar precludes obfuscation of the boundary between phonological conditioning on the one hand and semantic and symbolic on the other. In a rule-based approach like the SPE model of Chomsky and Halle (1968), what on the surface seems to involve morphological information may be dressed up as phonologically conditioned by means of abstract underlying representations and a battery of ordered, procedural rules (see e.g. Lass 1984: 203 for discussion). We shall return to the abstractness issue in chapter 7; at present it is sufficient to note that Cognitive Grammar avoids the problem for the simple reason that this framework does not assume underlying representations. Cognitive Grammar focuses on relations among surface forms, not on their relations to postulated underlying representations.

A second important property of the analysis of conditioning environments as schemas concerns the semiotic function of alternations. In the beginning of this book I asked if the truncation and softening alternations have a meaning. In the context of contemporary linguistics with the dominance of generative approaches, this question may seem unconventional. However, in Cognitive Grammar it makes perfect sense. We have just seen that alternations can be analyzed in terms of schemas, and that the schemas can be of the symbolic type which contains phonological and semantic information. Symbolic schemas are essentially Saussurian signs, i.e. arbitrary mappings of meaning and form. If an alternant is conditioned by e.g. present tense, it makes sense to say that this alternant is a present tense marker, because it is part of a symbolic schema where "present tense" is the semantic pole. We shall return to the semiotic function of the truncation and softening alternations in great detail in chapter 11. Suffice it to say at this point that symbolic schemas facilitate a straightforward account of the semiotic function of alternations. In this regard, Cognitive Grammar shows affinity to structuralistic approaches to alternations, which often mention "semantization". Interestingly, such claims are often made in the Russian linguistic tradition, which is a direct continuation of Baudouin de Courtenay's early works on alternations (cf. Zinder 1960: 58, Maslov 2004: 760–764). The semiotic dimension is also important in Natural Morphology (cf. e.g. Dressler and Gagarina 1999).

5.1.3. Alternations in the language system as a whole

The questions considered in sections 5.1.1 and 5.1.2 concern the properties of alternations in isolation. However, an adequate theory must furthermore accommodate the role alternations play in the language system as a whole. Let us consider three factors that bear on this question: centrality, productivity and interaction.

The networks in Figures 5.2 and 5.3 contain relevant subtypes of the truncation alternation, but leave the impression that all schemas are equally important in the language system as a whole. For instance, in Figure 5.2 the two schemas in the third row from the top show that the alternations in question are of two types. However, the figure gives no hints about the fact that the schema to the left covers the vast majority of the relevant verbs. How can we capture the generalization that the leftmost schema represents a central pattern, whereas the schema to the right is marginal? A key concept is entrenchment (cf. section 2.3). Since the schema to the left covers thousands of verbs, this schema is much more entrenched, as depicted in Figure 5.5. Notice that I include an extension relation between the two schemas in the lower portion of the figure. In this way we further emphasize the difference between the central (prototypical) and the marginal pattern.

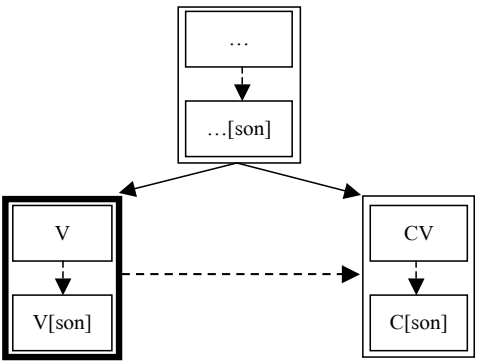

Figure 5.5. Central and marginal alternations

Centrality is closely related to productivity. However, although large classes are often productive, centrality and productivity are not the same. Not all large classes are productive and, conversely, fairly small classes sometimes are able to attract new members. A well-known example from the literature is strong verbs in English. As demonstrated by Bybee and Slobin (1982), for instance, the small class of strong verbs like *string* shows some degree of productivity. How can

productivity be represented in Cognitive Grammar? Once again, entrenchment seems relevant, because entrenched schemas are salient in the grammar. Figure 5.6, which concerns verbs with stem-final [a] in the past tense and infinitive, illustrates this. The left portion of the diagram depicts the relative salience of schema and instantiations for verbs like *delat'*, which add [j] to the stem in the present tense and imperative forms. The schema covers a large class, but the instantiations represent what Tuggy (2005) has called "an undistinguished mass of cases, none of which stand out from the other". This class of verbs is productive; the schema is more salient than the instantiations, and therefore easily attracts new verbs.

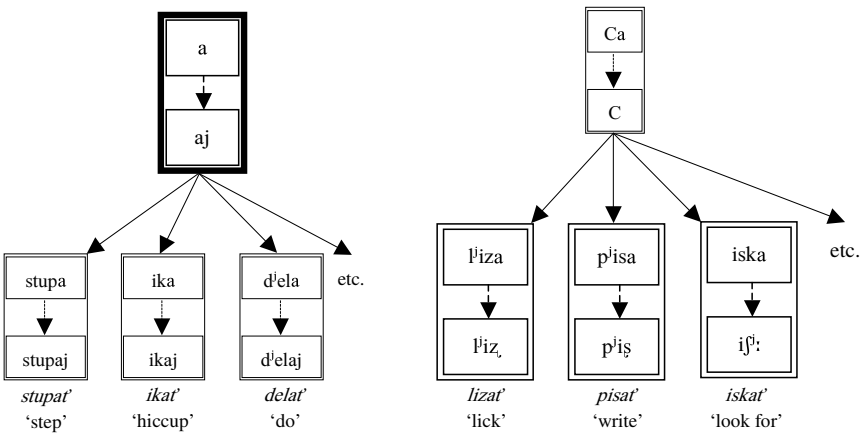

Figure 5.6. Relative salience of schemas and instantiations

The rightmost portion of Figure 5.6 concerns verbs of the type *pisat'* 'write'. Like verbs of the *delat'* type these verbs have stem-final [a] in the past tense and imperative, but instead of adding [j] in the present tense and imperative, they delete [a]. There are about a hundred simplex verbs of the *pisat'* type in present-day Russian (Švedova (ed.) 1980: 653), so this schema encompasses a much smaller number of instantiations than the schema for the *delat'* class. At the same time, however, each instantiation is more salient in the *pisat'* class than in the *delat'* class. Metaphorically speaking, while the instantiations in the *delat'* class are like grains of sand in a large pile, the instantiations in the *pisat'* class resemble large countable objects with clearly distinguishable properties. The *pisat'* pattern is not productive. The instantiations are more salient than the general schema, which is therefore not likely to attract new members to the class.

Productivity is a truly complex area (cf. e.g. Bauer 2001 and references therein), and a thorough investigation is beyond the scope of the present study. However, it seems fair to say that Cognitive Grammar offers a promising account of productivity in terms of the relative salience of a schema and its instantiations. No extra machinery is required in order to account for productivity; schemas, instantiations and entrenchment are central concepts in the framework that are exploited in the analysis of numerous linguistic phenomena. Notice that the proposed account predicts that productivity is a gradient category, since the relative salience of schemas and its instantiations is a matter of degree. The prediction is borne out by the facts. For instance, Dressler and Gagarina (1999) have shown that Russian verb classes are productive to different degrees.

Comparison of the *delat'* and *pisat'* classes leads us to the last factor characterizing the role of alternations in the language system as a whole, viz. interaction. In this book we shall consider two kinds of interaction, which may be referred to as "competition" and "conspiracy". The two schemas in the upper portion of Figure 5.6 compete in the sense that verbs with stem-final [a] in the past tense and infinitive are compatible with both schemas. Both schemas are equally (non-)specific, so they are in a tie with regard to conceptual overlap. However, since the schema for the *delat'* class is more entrenched, the analysis predicts this schema to take precedence. This prediction is correct, insofar as the *delat'* class attracts new members, while the *pisat'* class does not. On the contrary, as mentioned in section 5.1.1, the *pisat'* class is in the process of losing members to the *delat'* class. In order to account for the members that remain in the *pisat'* class, we must either assume that they are stored individually or that there are more specific schemas in the grammar that cover verbs with certain properties. I shall not work out the analysis in further detail here, since this is not necessary to illustrate how competing alternations can be accommodated in Cognitive Grammar.

Alternations do not always compete – in chapter 11 I will suggest that the truncation and softening alternations also conspire. In section 5.1.2 I argued that alternations that have semantic conditioning constitute signs in the sense of Saussure ([1916] 1984). In such cases, the alternants are markers of some content, e.g. a grammatical category. I argue that the truncation and softening alternations create a situation where an alveo-palatal consonant in stem-final position is characteristic of forms with the feature "non-past". We shall return to the details of the analysis in chapter 11. At this stage, the important point is that the non-past marker is the joint result of both the truncation and softening alternations. In this sense, the two alternations conspire to mark non-past meaning. The conspiracy will be accounted for by means of a first-order schema capturing a product-oriented generalization.

5.1.4. Summarizing the theory

I have argued that an adequate theory of alternations must address three questions, which subsume a number of parameters. Here is an overview of the questions and parameters, as well as information about how they are accounted for in Cognitive Grammar:

(1) Relating the alternants (cf. 5.1.1)
   a. **(A)symmetry:** Cognitive Grammar accounts for asymmetric relations between alternants by means of unidirectional extension relations. Bidirectional extensions accommodate symmetric relations.
   b. **Similarities and differences:** Category networks enable us to capture both similaries and differences among the alternants.

(2) Conditioning environment (cf. 5.1.2)
   a. **Form:** When an alternation is conditioned by form alone, phonological schemas are invoked.
   b. **Meaning:** Semantic schemas accommodate alternations that are conditioned by meaning.
   c. **Form and meaning:** Symbolic schemas are employed for alternations that are conditioned by both form and meaning.

(3) Role in the language system as a whole (cf. 5.1.3)
   a. **Centrality:** The difference between central and peripheral alternations is represented by different degrees of entrenchment.
   b. **Productivity:** Cognitive Grammar accounts for degrees of productivity in terms of the relative salience of schemas and instantiations.
   c. **Interaction:**
      – **Competition:** The principles of inherent ease of activation and conceptual overlap facilitate an account of competing alternations.
      – **Conspiracy:** Generalizations about conspiring alternations are captured by category networks.

I would like to repeat two important theoretical points. First, since Cognitive Grammar does not assume abstract underlying representations, it is impossible to dress up morphological conditioning as phonological conditioning on an abstract level. Second, symbolic conditioning (2c) enables us to accommodate the semiotic function of alternations as Saussurian signs where a formal alternation corresponds to a shift in meaning. With this in mind, we are now ready to examine the factors conditioning the truncation alternation. This is the topic of the remainder of this chapter.

5.2. Form-based generalizations: The one-stem system

Contrary to conventional wisdom, I suggest that the truncation alternation involves symbolic motivation in the sense that both form and meaning are relevant. We return to meaning in section 5.4; until then we will be concerned with the form-based generalizations that go back to Jakobson's famous article "Russian Conjugation" (1948).

In order to examine the conditioning environment of the truncation alternation, we need to consider full paradigms. The verbs *delat'* 'do' and *pisat'* 'write' in Table 5.1 provide excellent illustrations. As can be seen from the table, both verbs have consonant-final stems whenever the inflectional ending begins with a vowel, viz. [dʲélaj] and [pʲiʂ]. However, in forms where the ending starts with a consonant, the stem displays a vowel in final position. The generalizations can be stated as follows:

(4) a. Before a V-initial ending, the stem ends in a C, cf. [dʲélaj+it] and [pʲíʂ+it].
b. Before a C-initial ending, the stem ends in a V, cf. [dʲéla+l] and [pʲisá+l].

In other words, of the four logical combinations of consonants and vowels, only two are attested across the stem-suffix boundary in Russian verbs, viz. C+V and V+C. Consonant clusters (C+C) and hiatus (V+V) are avoided. Admittedly, there are exceptions to these generalizations. In chapters 6 and 7, we shall study the exceptional behavior of non-suffixed verbs in the past tense and the infinitive, and in chapter 8 we shall consider imperative forms like [dʲélaj] and [dʲélaj+tʲi], which have consonant-final stems although there is no following vowel-initial ending. Despite these special cases, however, the generalizations in (4) represent the default pattern, and therefore arguably must be part of any adequate analysis of Russian conjugation.

Making the generalizations in (4) explicit, Jakobson (1948) offered a lasting contribution to the empirical study of Russian verb inflection. However, Jakobson's article is not only important from an empirical point of view; because it contributed to the development of generative linguistics, it is also of great theoretical importance. In order to capture the generalizations in (4), Jakobson made two assumptions that anticipated classical generative phonology (e.g. Chomsky and Halle 1968). First, Jakobson (1948: 156) proposed that each verb has one underlying stem which equals the longer of the two stems attested on the surface. Thus, *delat'* has the C-final underlying stem /dʲélaj/, while the V-final /pʲisá/ is the underlying stem of *pisat'*. Jakobson's second crucial assumption concerns rules. He devised rules that truncate the stem by deleting its final segment. Sim-

plifying somewhat, a stem-final V is deleted before a V-initial suffix, while a stem-final C is deleted before a C-initial suffix. Informally, we may state the truncation rules as follows:

(5) a. V → Ø / _ + V ("Delete stem-final V before V-initial ending")
b. C → Ø / _ + C ("Delete stem-final C before C-initial ending")

Rule (5a) shortens the underlying stem /pʲisá/ to [pʲiṣ] before V-initial suffixes, while nothing happens before C-initial suffixes.[47] Underlying /dʲélaj/ undergoes truncation by rule (5b), ensuring that /j/ is deleted before a consonant, but retained before a vowel. (We shall return to the exceptional behavior of the imperative in chapter 8.)

In section 5.1.1 we considered Andersen's (1980) important critique of Jakobson's truncation rules suggesting that verbs like *delat' add* [j] in the present tense and imperative forms, rather than *removing* it in the past tense and infinitive. We shall not return to this issue here; at this point, the important question is whether the process (truncation or addition) is triggered by the shape of the following ending or not. From a theoretical perspective, it is important to notice that (5) does not contain static constraints on representations, but rather procedures that generate surface forms when applied to the underlying representations of the stems. Assuming procedural rules that apply to underlying representations, Jakobson paved the way for generative phonology. As pointed out by Shapiro (1980: 67), Jakobson's article "became a seedbed for an over-arching concept of language that was later known as transformational-generative grammar". Jakobson's impact on the development is well documented. According to Anderson (1985: 318), Morris Halle, who was Jakobson's student at Columbia and Harvard and later on his collaborator, was "greatly impressed and attracted" by "Russian conjugation". Although Jakobson's paper did not receive much attention among American linguists at the time, it seems to have been pivotal in the development of Halle's ideas. In this sense, there is a direct line from Jakobson's "Russian conjugation" (1948) to Halle's *The sound pattern of Russian* (1959) and Chomsky and Halle's *The sound pattern of English* (1968).

The representation of the generalizations in (4) by means of underlying representations and the rules in (5) are known in Slavic linguistics as the One-Stem System. It has been subject to intense discussions in Slavic linguistics (cf. Nes-

47 Additional rules are necessary in order to accommodate the transitive softening of underlying /s/ to [ṣ], but we shall not consider that here, since it does not bear on the discussion of the truncation alternation. We return to the factors conditioning the transitive softening alternation in chapter 10.

48 Both verbs are imperfective. For the cells in the paradigm that are only attested for perfective verbs perfectivizing prefixes are given in parentheses.

Table 5.1. The truncation alternation of *delat'* 'do' and *pisat'* 'write'[48]

		delat' 'do'	*pisat'* 'write'
Present tense	1 singular	dʲélaj+u	pʲiʂ+ú
	2 singular	dʲélaj+iʂ	pʲíʂ+iʂ
	3 singular	dʲélaj+it	pʲíʂ+it
	1 plural	dʲélaj+im	pʲíʂ+im
	2 plural	dʲélaj+itʲi	pʲíʂ+itʲi
	3 plural	dʲélaj+ut	pʲíʂ+ut
	Passive participle	dʲélaj+imij	—
	Active participle	dʲélaj+uʃʲ:ij	pʲíʂ+uʃʲ:ij
	Gerund	dʲélaj+a	pʲiʂ+á
Imperative	2 singular	dʲélaj	pʲiʂ+í
	2 plural	dʲélaj+tʲi	pʲiʂ+ítʲi
Past tense	Masculine singular	dʲéla+l	pʲisá+l
	Feminine singular	dʲéla+la	pʲisá+la
	Neuter singular	dʲéla+la	pʲisá+la
	Plural	dʲéla+lʲi	pʲisá+lʲi
	Passive participle	(zʲ)dʲéla+n	(na)pʲísa+n
	Active participle	dʲéla+fʂij	pʲisá+fʂij
	Gerund	(zʲ)dʲéla+f	(na)pʲisá+f
Infinitive		dʲéla+tʲ	pʲisá+tʲ

set 1998a: 53–54 for an overview with references), and it has been adapted for pedagogical purposes (cf. e.g. Levin 1978, Lipson 1981 and Townsend 1975). It is important to notice that as the term tends to be used, the One-Stem System subsumes both a set of descriptive generalizations and a linguistic model for the explication of these generalizations. The statements in (4) are descriptive generalizations. It is an observable fact that certain forms of *delat'* contain [j], which is absent in other forms of this verb. In the same way, it is a fact that [a] in *pisat'* is attested in some, but not all the forms of this verb. In other words, we can observe the truncation alternations [j] ∼ Ø and Ø ∼ [a], and we can make generalizations about the environment conditioning these alternations – e.g. the Jakobsonian generalizations in (4). However, underlying representations and procedural rules are not empirical facts, but rather artifacts of a linguistic model. While we can observe the alternations in forms actually occurring in utterances, nobody has ever observed a procedural rule or an abstract underlying

representation directly. They are theoretical constructs that linguists devise in order to generate observable surface forms. If a mentalist approach is adopted, they can furthermore be regarded as hypotheses concerning the mind of the language users.

The reason why I think it is important to draw a distinction between descriptive generalizations and linguistic models is that once this distinction has been established, it allows us to ask the following question: Do Jakobson's descriptive generalizations in (4) presuppose his linguistic model? In other words, is it possible to accommodate the generalizations in (4) without invoking abstract underlying representations and procedural rules? I propose that Jakobson's generalizations do *not* presuppose his model, because it is possible to capture the generalizations in (4) in a model without underlying representations and procedural rules – Cognitive Grammar.

5.3. Form-based generalizations in Cognitive Grammar

In section 5.1, we saw that schemas are pivotal in the Cognitive Grammar approach to alternations. Is it possible to express the generalizations in (4) by means of schemas? Consider Figure 5.7. The schema to the left in the figure was already presented in section 5.1.2. As mentioned there, it shows that a V-initial ending is preceded by an elaboration site represented as suspension points included in a circle, which tells us that the ending requires a preceding stem. The dashed correspondence line shows that the stem in question is of the C-final type. In this way, we capture the generalization that a V-initial ending selects for a C-final stem. The schema to the right in Figure 5.7 parallels the schema to the left, but here we have a C-initial ending building a word by selecting a V-final stem.[49]

Taken together, the two schemas in Figure 5.7 suffice to capture Jakobson's generalizations in (4) about the relationship between the shape of the endings and the stem in Russian verbs. However, in order to avoid unnecessary complications I shall assume the more compact schema format in Figure 5.8 in the remainder of this chapter. In Figure 5.8, V+C stands for a C-initial ending preceded by a V-final stem and C+V for the combination of a V-initial ending and a C-final stem. The + sign marks the morpheme boundary between the stem and the inflectional ending. Since these schemas do not contain the elaboration sites, they do not

49 Notice in passing that it is possible to conflate the two schemas by means of so-called alpha notation. If one assumes that Russian vowels are [+syllabic] and consonants [syllabic] one can unite VC and CV as [αsyllabic][αsyllabic]. I will not pursue the merits of this proposal in this book.

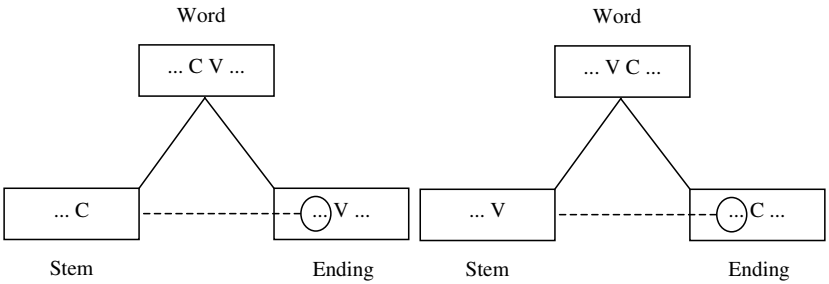

Figure 5.7. Schemas for verbs with C-initial (left) and V-initial (right) endings

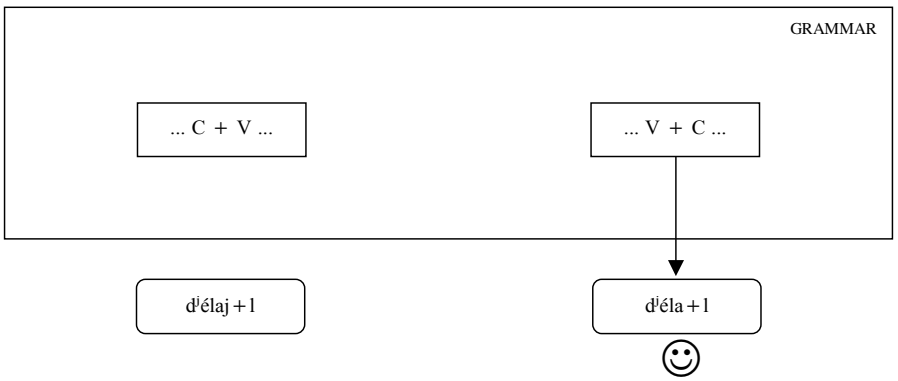

Figure 5.8. Analysis of a verb form with a C-initial ending

make explicit the fact that it is the ending that selects the stem and not the other way around. However, for our purposes the compact schema format is precise enough.

Figure 5.8 depicts the interaction between the schemas for C+V and V+C, where a language user wonders whether to select the form [dʲélaj+l] with a C-final stem or [dʲéla+l] with a V-final stem. There are no schemas for V+V (hiatus) or C+C (consonant cluster) in the grammar, so these combinations are excluded. As mentioned in section 2.3, negatively specified prohibitions cannot be stated as schemas in Cognitive Grammar, but the absence of a schema for a particular structure accounts for its non-existence in the language. The candidate to the left in Figure 5.8 contains the consonant cluster [j+l] and therefore gains no support from the grammar. The candidate to the right, on the other hand, involves the V+C combination [a+l] and is therefore an instantiation of the rightmost schema in the grammar fragment. Since the rightmost candidate is the only candidate that shows conceptual overlap with the schemas in the grammar, this candidate

is correctly predicted to be the winner – as shown by the smiling face underneath this candidate.

Figure 5.9 involves the same grammar fragment as Figure 5.8, but the candidates concern a form with a V-initial ending, viz. the 1 singular present tense. Here, it is the leftmost candidate that displays conceptual overlap with the grammar, since it involves a C+V combination: [j+u]. The [a+u] combination in the rightmost candidate gains no support in the grammar, since no schema licenses hiatus. Therefore, the candidate to the left is predicted to be the winner – a prediction that is borne out by the facts.

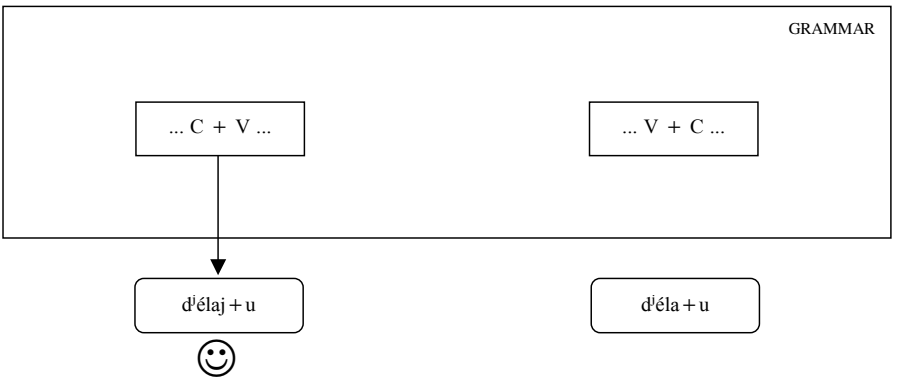

Figure 5.9. Analysis of a verb form with a V-initial ending

I started this section by asking whether the Jakobsonian generalizations in (4) could be captured in Cognitive Grammar, although this model lacks underlying representations and procedural rules. At this point it should be clear that the answer is in the affirmative. Figures 5.8 and 5.9 indicate that the generalizations can be accommodated by means of schemas representing the CV combinations that occur in surface forms. In other words, even if we adopt Jakobson's descriptive generalizations regarding the truncation alternation, we do not have to adopt his truncation *rules* in (5). Cognitive Grammar accommodates all Jakobson's observations about the truncation alternation by means of schemas.

5.4. Synthesis: Incorporating the meaning-based generalizations of the two-stem system

Metaphorically speaking, in the two previous sections I extracted the generalizations of the Jakobsonian One-Stem System and transplanted them into Cognitive

Grammar, which is based on very different theoretical assumptions. In this section, I shall show that Cognitive Grammar is able to accommodate the descriptive generalizations of the Two-Stem System as well. On this basis it will be argued that Cognitive Grammar provides a synthesis between the two systems for the description of Russian conjugation.

The Two-Stem System is the first approach to serve as the basis for scientific study of the verb in Slavic, and it is still widely used in Europe, inter alia in a number of influential grammars (e.g. Isačenko 1982 and Švedova (ed.) 1980). As suggested by the name, this approach assumes two stems per verb, a present tense stem and a past tense (infinitive) stem. Since there is no single underlying stem for all the forms of a verb, and no procedural truncation rules transforming them to surface forms, the Two-Stem System is theoretically different from Jakobson's One-Stem System. However, there are also empirical differences. Instead of relating the shape of the stem to the shape of the following ending, the shape of the stem is implicitly related to meaningful features like "present tense" and "past tense", which are used to describe the stems. In a broad sense, therefore, the Two-Stem System implicitly provides generalizations in terms of (grammatical) meaning.

Descriptions couched in the Two-Stem System do not make the meaning-based generalizations explicit, which may be why such generalizations are not taken seriously by adherents of the Jakobsonian One-Stem System. Characteristic in this respect is Chvany (1990: 432) who states that "the distinction relevant to Russian conjugation is phonological, or morphophonemic, rather than semantic (as falsely suggested by traditional labels like 'present stem' and 'past-infinitive stem')". Chvany's remark is problematic because it is not corroborated by any evidence, and because it presupposes that generalizations about Russian conjugation must be either phonological or semantic in nature. In this section, I will provide empirical evidence in favor of meaning-based generalizations. Meaning-based generalizations complement form-based generalizations, and Cognitive Grammar integrates both kinds of generalizations.

In order to arrive at a more precise understanding of the descriptive generalizations implicit in the Two-Stem System, we must consider the structure of the Russian verb paradigm. In section 4.2, I mentioned that it consists of four subparadigms: present tense, imperative, past tense and infinitive. The subparadigms are represented as rectangles in Figure 5.10. For each of them, I have given the CV combination that is found in this morphological environment. (I ignore deviations from the basic pattern, but we shall return to them in the following chapters.) As we can see from the shaded cells in the figure, the C+V schema is characteristic of the present and imperative subparadigms, which contain the forms created on the basis of the present tense stem in the terminology

Present C+V	Imperative C+V
Past V+C	Infinitive V+C

Figure 5.10. Well-behaved form-meaning distribution (attested)

of the Two-Stem System. In the past tense and the infinitive, on the other hand, we find the V+C schema. In other words, the past tense (infinitive) stem ends in a vowel, whereas the present tense/imperative stem ends in a consonant.

The situation in Figure 5.10 is referred to as "well-behaved distribution" because form and meaning neatly divide the paradigm in two parts. The C+V schema corresponds to the present tense and the imperative, while the past tense and infinitive have V+C. This well-behaved distribution suggests that we are dealing with a significant generalization that should be accounted for in an adequate analysis. We must ask whether the analysis developed so far in this chapter captures the well-behaved distribution. No doubt, the answer is in the negative, but as we shall see the weakness can be repaired. Before we turn to the solution, however, let me clarify what creates the problem. The schemas representing the truncation alternation in section 5.2 do not say anything about meaning; they merely relate the shape of the stem to the shape of the following ending. In other words, these schemas are potentially compatible with any form-meaning distribution. In order to see this more clearly, consider Figure 5.11. In this non-attested, extremely untidy paradigm, there is no simple relationship between form and meaning; the subparadigms contain both C+V and V+C in a random fashion. Nevertheless, this paradigm is compatible with the schemas explored in section 5.2 because all cells contain permitted CV

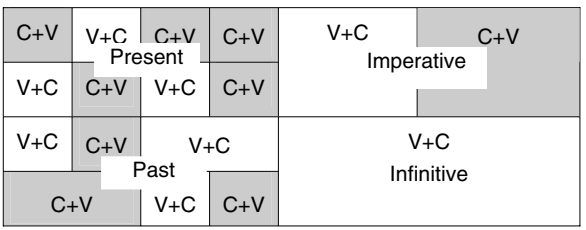

Figure 5.11. Random form-meaning distribution (not attested)

combinations. We find C+V and V+C, but no C+C or V+V strings. In the real, attested situation depicted in Figure 5.10, on the other hand, there is a tidy form-meaning correlation, which should be captured in the analysis. On this basis, I suggest that an analysis in terms of form alone is incomplete. Such an analysis presents the form-meaning distribution as a coincidence, and therefore fails to capture the generalization that authentic Russian paradigms are of the well-behaved type in Figure 5.10, and not of the untidy hypothetical type depicted in Figure 5.11. In order to accommodate the generalization, we must incorporate meaning in the analysis. The question is how.

Let us first consider the present tense and imperative subparadigms where we have C-final stems and V-initial endings. How can we add information about meaning to the C+V schema introduced in section 5.2? Is there a feature or a set of features that all forms in these two subparadigms share? I would like to propose that there is, and take tense and time reference as my point of departure. The relevant forms can be divided into three groups: present tense forms of imperfective verbs, present tense forms of perfective verbs and imperative forms (of both aspects). A present tense form of an imperfective verb, say *delaju* 'I do', usually indicates overlap with the moment of speech, i.e. present tense.[50] I represent this by means of the formula E = S, where E stands for event time and S for speech time. A corresponding form of a perfective verb, e.g. *sdelaju* 'I will do', normally indicates that the event takes place after the moment of speech. In other words, we are dealing with future tense, which we can represent as E > S.[51] Imperative forms like *delaj* (imperfective) and *sdelaj* (perfective) 'do!' instruct the addressee to carry out an action. This action will by necessity take place after the moment of speech, so in this sense the imperative involves future time reference. Whether one chooses to analyze this as tense or not is

50 In order to avoid irrelevant complications I limit myself to so-called absolute tense, where the event time is related to the moment of speech. However, Russian verb forms may also display so-called relative tense, where a point in time other than the moment of speech serves as the reference point. In Nesset (1998a: 180–181) I give a brief overview of relative tense in Russian. Another complication concerns the gerunds in the present tense subparadigm. Examples where such gerunds refer to situations anterior to a reference point are attested (Rappaport 1984: 87–88). However, in Nesset (1998a: 183–187) I argue that prototypically the gerunds in question denote events simultaneous with a reference point and therefore in the prototypical case involve (relative) present tense.

51 Forms in the present tense subparadigm of perfective verbs are marginally possible in situations simultaneous with or prior to the moment of speech. For relevant examples and a recent analysis couched in cognitive linguistics, see Dickey (2000: 141, 179 et passim). In view of the peripheral status of such examples, I shall not discuss them in this book.

an interesting theoretical question, but it is not of importance for the topic of this book, so I shall not discuss it in the following. Here is an overview of the situation:

(6) a. Present tense form (imperfective): E = S (present, e.g. *delaju* 'I do')
b. Present tense form (perfective): E > S (future, e.g. *sdelaju* 'I will do')
c. Imperative form: E > S (future, e.g. *(s)delaj!* 'do!')

Is it possible to establish a schema that covers all the three cases in (6)? It clearly is, because they are all compatible with what one may call "non-past" and represent as E > S. Notice that "non-past" is not a negatively specified schema. It does not stand for the "absence of past tense" (which would include tenseless forms, as well as present and future tense). Rather, as the label is used in this book, "non-past" unites verb forms that involve reference to the continuous part of the timeline beginning with the moment of speech. It would be possible to use the label "present-future" instead, but I prefer the more traditional "non-past". If we combine the non-past meaning with the C+V form we get the schema to the left in Figure 5.12. This schema captures the form-based generalization of the One-Stem System and at the same time incorporates the meaning-based generalization of the Two-Stem System.

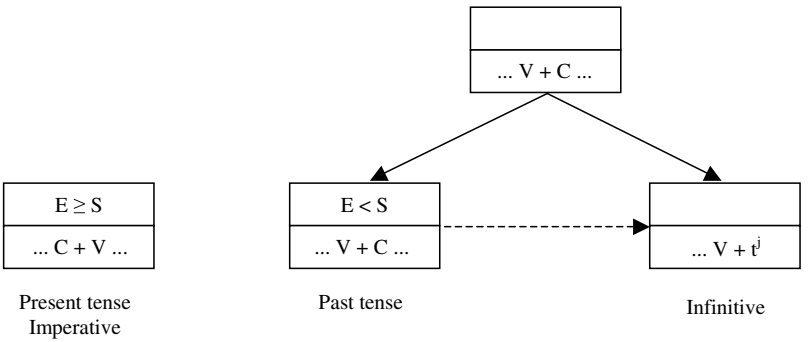

Figure 5.12. Schemas incorporating form and meaning

What about the past tense and infinitive subparadigms? Are there any generalizations about the form-meaning distribution in these subparadigms that need to be accommodated in the analysis? Let us consider the past tense subparadigm first. These forms usually refer to situations prior to the moment of speech.[52]

52 One minor complication deserves mention. The gerunds in the past tense subparadigm may marginally refer to situations taking place simultaneously with or posterior to a reference point. However, prototypically such gerunds denote situa-

Employing the format in (6), I represent this as E < S. In order to capture the generalization that the past tense subparadigm displays a well-behaved relationship with meaning and form, I suggest supplementing the V+C schema with information about past tense in Figure 5.12.

Like the schema for the past tense subparadigm, the schema for the infinitive in Figure 5.12 is of the V+C type. I have specified the consonant in question as [tʲ], which is the default ending in the infinitive. (We shall return to infinitives in [tʲi] and [tʃʲ] in chapter 6; they are tangential to the issues discussed in the present chapter.) As the infinitive does not have tense, it is difficult to see any straightforward ways to connect the meanings of the past tense and the infinitive. In Nesset (1998a: 223–242) I speculate about a possible connection in terms of nominal properties. Observing that infinitives occupy the syntactic slots normally reserved for nominals (subject, object etc.), I argue that the formation of the infinitive involves the reification of a process.[53] As for past tense forms, there are two ways of relating them to nominals. First of all, events in the past tense arguably show a higher degree of reification than processes that may or may not be carried out in the future. Events in the past are facts, and facts resemble things. Secondly, the Russian finite past tense forms historically developed from participles. They are still inflected for gender, which is a category normally associated with nominals, so arguably the past tense forms have retained some of their nominal properties.

In view of the somewhat speculative nature of this line of reasoning, however, I have not tried to incorporate it in the schemas in Figure 5.12. The upper portion of the schema for the infinitive is therefore left blank. Accordingly, the topmost schema bringing the past tense and infinitive subparadigms together only refers to form. In spite of this, however, the category network to the right in Figure 5.12 as a whole offers further support for the point I made above that a purely form-based analysis is incomplete. As argued above, reference to past tense is crucial in the analysis of this subparadigm. Notice that in the figure I connect the schemas for the past tense and the infinitive by means of an extension arrow pointing at the latter subcategory. While the infinitive is the citation form used in grammars and dictionaries, it seems likely that the more frequent past tense forms enjoy a more central status in the mental grammars of the language users. However,

---

tions anterior to a reference point and are thin this sense they are in harmony with the analysis proposed in this book (see Nesset 1998a: 209–210 for discussion).

53 A thorough analysis of Russian infinitives as reified processes is given in Divjak (2004: 87 et passim).

since for present purposes nothing hinges on this decision, I shall not discuss it in the following.[54]

Summarizing this section, we have seen that Cognitive Grammar enables us not only to capture the form-based Jakobsonian generalizations of the One-Stem System, but also incorporates the meaning-based generalizations implicit in the Two-Stem System. In this way, Cognitive Grammar facilitates a synthesis between the One-Stem and Two-Stem Systems. In section 5.1, I drew a distinction between linguistic models and descriptive generalizations. It should be clear by now that the synthesis I propose is a synthesis in terms of descriptive generalizations. I have not tried to synthesize the linguistic models of the traditional One-Stem and Two-Stem Systems. Sometimes the one-stem vs. two-stem controversy is presented in terms of how many underlying stems a Russian verb has. However, this question presupposes a framework where generalizations are captured in terms of underlying representations, e.g. a model of the traditional generative phonology type. In Cognitive Grammar, on the other hand, generalizations are captured in terms of schemas and categorizing relationships. Since Cognitive Grammar does not have underlying representations, the question about the number of underlying stems does not arise in this model.

5.5. Further evidence: The past passive participle

In this section we shall consider the past passive participle (henceforth PPP), which on the face of it seems to provide a counterexample to the analysis devel-

54 An anonymous referee suggests an approach in terms of proximity, which complements the analysis developed in this book. Since the present tense relates to the moment of speech, this tense can be classified as "proximate" as opposed to the past tense, which is "distal" in that it involves events that are not contemporaneous with the moment of speech. On the assumption that imperatives typically instruct the addressee to carry out an action *now*, i.e. as soon as possible after the moment of speech, the referee suggests that imperatives are peripheral members of the proximate category. Infinitives can be considered distal, insofar as they tend to locate events outside real time. The analysis can be summarized in tabular form:

	Prototypical	Peripheral
Proximate	Present	Imperative
Distal	Past	Infinitive

The proximity approach is not without problems. For instance, it is not clear how to accommodate present tense forms of perfective verbs, which normally denote events in the future. In spite of problems like this, however, the proximity approach deserves to be developed further.

oped in the previous section. However, I shall argue that upon closer examination it turns out that the PPP offers further evidence in favor of the usage-based approach.

As suggested by the name, the PPP is normally considered part of the past tense subparadigm. In the previous section, we saw that past tense forms have C-initial endings, which combine with V-final stems, e.g. [dʲéla+l] '(he) did' and [pʲisá+l] '(he) wrote'. In other words, the prediction from the analysis is that the PPP has C-initial endings. However, this is only partly true. As can be seen from (7), the PPP has three allomorphs. Two of them, [t] and [n] are C-initial as predicted, but the third, [on], is not. Seemingly, therefore, the PPP is at variance with the analysis proposed above.

(7) a. [t]: [pocínu+t] 'abandoned'
b. [n]: [zʲdʲéla+n] 'done'
c. [on] [pragavarʲ+ón] 'said'

The combination of C+V and V+C patterning in PPP formation may appear to be a counterexample to the analysis presented above, since PPP forms with [on] seem to indicate that the relationship between past tense and V+C is less strong than suggested above. However, a closer look at the meaning of the PPP reveals a more nuanced picture (see also Nesset 1998a: 216–221 for discussion). Typically, the PPP signals perfect tense/aspect involving both an action in the past and a resulting state in the present. Thus a PPP like *pokinut* 'abandoned' in (7a) implies that something or somebody was abandoned in the past, but also that he/she/it is in the state of being abandoned (i.e. alone) at a later point, which in the unmarked case is the moment of speech. Although both the action and the resultant state are part of the meaning of the PPP, the context may foreground the action part: [55]

(8) Posle načala osvoenija neftegazovyx mestoroždenij [...] èta territorija byla počti polnost'ju **pokinuta** mestnym naseleniem. (*Žizn' nacional'nostej*, 2004)
'After the exploitation of the petroleum resources began [...], this area was almost completely **abandoned** by the local population'.

Here it is clear that it is the action that it is important because it is embedded in a chain of events: First the exploitation of the petroleum resources started, and then the local population abandoned the area. However, the resultant state can also be foregrounded:

55 Examples (8), (9) and (12) are from the Russian National Corpus (www.ruscorpora.ru).

(9) Teper' vse zdes' bylo **pokinuto** i zabrošeno, i za vse vremja im popalsja vsego odin žiloj dom. (Brothers Strugatsky)
'Now everything here was **abandoned** and deserted, and during all that time they encountered only one inhabited house.'

The adverbial *teper'* 'now' tells us that it is the result of the action that is in focus here; the authors emphasize the state of emptiness resulting from an earlier action of abandoning the place. In some cases, however both an "actional" and a "resultative" reading are possible:

(10) V ètot moment svet v komnate byl **pogašen**. (Knjazev 1989: 35)
'At that time the light in the room was **switched** off'.

On the resultative reading this sentence conveys that it was dark at the relevant moment in the past. However, the sentence can also mean that at this moment someone switched off the light, thus creating a state of darkness.

Examples like these show that it is simplistic to say that the meaning of the PPP relates to the past tense subparadigm. Describing both an action in the past and a resulting state in the present, the meaning of the PPP relates to both the past and the present tense subparadigms. If we take this seriously, the analysis advanced in the previous section yields the prediction that the PPP displays both V+C and C+V. As shown in (7), this prediction is borne out by the facts, insofar as the C-initial endings [t] and [n] combine with a preceding V-final stem, while the V-initial [on] ending takes a C-final stem. Rather than being a problematic counterexample, therefore, the PPP in fact lends additional support to the analysis proposed in this study.

I hasten to add that this point should not be taken too far. It is, of course, not the case that the PPP alters its form according to whether it takes on a resultative or actional reading; both PPP forms with V+C and C+V allow resultative and actional readings. My observation is that the meaning relates the PPP both to the present tense/imperative and past tense/infinitive subparadigms, and that this fact is mirrored in the shape of the PPP, insofar as some PPP forms display the V+C pattern characteristic of the past tense and infinitive, while others have C+V as in the present tense and imperative subparadigm. This form-meaning relationship is in harmony with the analysis I propose, according to which the truncation alternation is symbolically conditioned by both meaning and form.

Before we leave the perfect meaning of the PPP, one conceivable objection must be discussed. Could it be that the meaning of the resultant state is due to the perfective aspect of the verb and therefore is not part of the meaning of the PPP? All the verbs discussed above are perfective, and it is well known that the

perfective aspect can convey that a state appears as the consequence of a previous action. The following sentence discussed by Bondarko (1971) illustrates this:

(11) Gde Jakov Savel'evič? –V ambare **zapersja**. (Bunin, cited after Bondarko 1971: 95)
'Where is Jakov Savel'evič? He has **locked himself in** in the barn.'

While the finite past tense form *zapersja* indicates that Jakov Savel'evič performed the action of locking himself in in the past, the sentence focuses on the state resulting from this action. This is clear from the question in the present tense as to where Jakov Savel'evič is now.

Although the perfective aspect may convey perfect meaning, there is solid evidence that the perfect is part of the meaning of the PPP too. In order to see this, consider the following example involving PPP forms of the imperfective verbs *kormit'* 'feed' and *myt'* 'wash':

(12) Zveri ne **kormleny**, Ivan Modestovič sejčas svoju kašu načnet trebovat', banja ne **myta**. . . (Bitov)
'The animals have not been **fed**, Ivan Modestovič now starts demanding his porridge, and the bath-house is not **washed. . .** '

This sentence foregrounds the resulting states: the animals are hungry because they have not been fed and the bath-house is dirty, because it has not been washed. Since the verbs in question are imperfective, the perfect meaning clearly is due to the PPP. In conclusion, therefore, the PPP involves reference to an action in the past and a resulting state in the present, and thus lends additional support to the analysis proposed in the previous section.

5.6. A special case: The [uj] ~ [ava] alternation

In this section, we shall explore verbs like *organizovat'* 'organize' and *kovat'* 'forge', which have an [uj] ~ [ava] alternation. On the face of it, verbs of this type may seem problematic for the analysis developed earlier in this chapter. However, we shall see that upon closer inspection they corroborate the proposed analysis.

In the case of *organizovat'*, [av] is part of a suffix as can be seen from the related noun *organizacija* 'organization', which does not contain [av]. As mentioned in section 4.5, verbs of this type represent a highly productive pattern that includes numerous more or less recent borrowings. In *kovat'*, which is not a borrowing, on the other hand, [av] is part of the root. This pattern is not productive. However, both *organizovat'* and *kovat'* display the [uj] ~ [ava]

Table 5.2. Verbs with the [uj] ~ [ava] alternation

		organizovat' 'organize'	*kovat'* 'forge'
Present tense	1 singular	argan^{j}izúj+u	kuj+ú
	2 singular	argan^{j}izúj+iṣ	kuj+óṣ
	3 singular	argan^{j}izúj+it	kuj+ót
	1 plural	argan^{j}izúj+im	kuj+óm
	2 plural	argan^{j}izúj+it^{j}i	kuj+ót^{j}i
	3 plural	argan^{j}izúj+ut	kuj+út
	Passive participle	argan^{j}izúj+imij	—
	Active participle	argan^{j}izúj+uʃ^{j}:ij	kuj+úʃ^{j}:ij
	Gerund	argan^{j}izúj+a	kuj+á
Imperative	2 singular	argan^{j}izúj	kuj
	2 plural	argan^{j}izúj+t^{j}i	kúj+t^{j}i
Past tense	Masculine singular	argan^{j}izavá+l	kavá+l
	Feminine singular	argan^{j}izavá+la	kavá+la
	Neuter singular	argan^{j}izavá+la	kavá+la
	Plural	argan^{j}izavá+l^{j}i	kavá+l^{j}i
	Passive participle	argan^{j}izóva+n	(s)kóva+n
	Active participle	argan^{j}izavá+fṣij	kavá+fṣij
	Gerund	argan^{j}izavá+f	(s)kavá+f
Infinitive		argan^{j}izavá+t^{j}	kavá+t^{j}

alternation, which is what makes them interesting in the present context. As shown in Table 5.2, both verbs have [uj] in stem-final position in the present tense and imperative subparadigms, while the [ava] alternant is found in the past tense and infinitive subparadigms.

The [uj] ~ [ava] alternation sets verbs like *organizovat'* and *kovat'* apart from the verbs explored earlier in this chapter. The question therefore arises as to whether the analysis I have developed is able to accommodate verbs with the [uj] ~ [ava] alternation. Figure 5.13 considers four conceivable candidates for the 1 singular present tense of *organizovat'*. The two candidates to the right involve hiatus ([a+u] and [u+u]) and therefore gain no support from the grammar. The two candidates to the left, on the other hand, are instantiations of the leftmost schema in the grammar fragment, since they both contain the consonant [j]

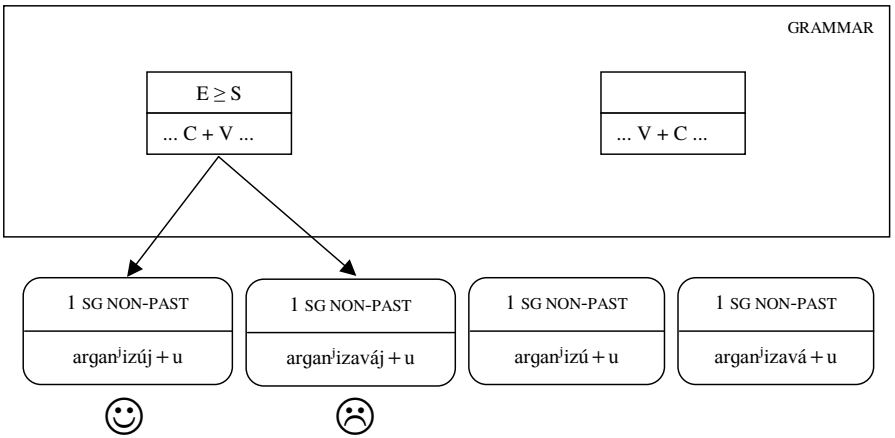

Figure 5.13. Schema interaction for *organizuju* 'I organize'

followed by the V-initial ending [u] and involve non-past meaning[56]. The leftmost candidate is correct as shown by the smiling face, but the second candidate from the left is not correct and is therefore supplied with a frowning face.

On the face of it, Figure 5.13 suggests that there is something wrong with the grammar. However, it is important to notice that the correct form [argan^{j}izúj+u] is *not* at variance with the grammar. After all it contains C+V combined with non-past meaning, and is therefore an instantiation of the leftmost schema in the grammar. Accordingly, the analysis developed earlier in this chapter enables us to select the correct winner, and at the same time exclude candidates with hiatus. I shall not include a figure for the past tense and infinitive subparadigms. However, the forms in Table 5.2 show that they are all in harmony with the grammar in Figure 5.13, because all the forms contain V+C combinations. In other words, the verbs with the [uj] ~ [ava] alternation comply with the two schemas proposed earlier in this chapter. In this sense, they lend additional support to the analysis I have developed.

This being said, however, it is clearly a problem that the analysis is too inclusive. Although it selects the correct form to the left in Figure 5.13, it also permits the incorrect candidate next to it. Incorrect forms like *[argan^{j}izaváj+u] are frequently produced by students of Russian as a foreign language, and are also well attested in child language (cf. Gor and Chernigovskaya 2003a and 2003b). The grammar in Figure 5.13 shows the systemic motivation for such forms. Never-

56 Since *organizovat'* can be both imperfective and perfective, the present tense forms can refer to situations in the present and the future. I therefore represent the meaning as "non-past" in the candidates in Figures 5.13–5.15.

theless, they are not part of the (adult) native speaker's language, and somehow this must be captured in the analysis. The descriptive generalization about verbs with the [uj] ~ [ava] alternation is simple:

(13) If the verb stem ends in [uj] in the present tense and imperative subparadigms, the verb has stem final [ava] in the past tense and infinitive subparadigms – and vice versa.

In other words, we are dealing with a bi-implicational relationship between the shape of the stem in the present tense and imperative subparadigms on the one hand and the past tense and infinitive subparadigms on the other. If the stem ends in [uj] in the present tense and imperative subparadigms, it has [ava] in the past tense and the infinitive. Conversely, a past tense or infinitive form with [ava] entails present tense and imperative forms with [uj]. In section 4.2, it was pointed out that implicational relationships between forms in the paradigm can be represented as second-order schemas. Instead of changing the schemas advanced earlier in the present chapter, I propose supplementing the analysis with a second-order schema for the verbs with the [uj] ~ [ava] alternation, as shown in Figure 5.14.

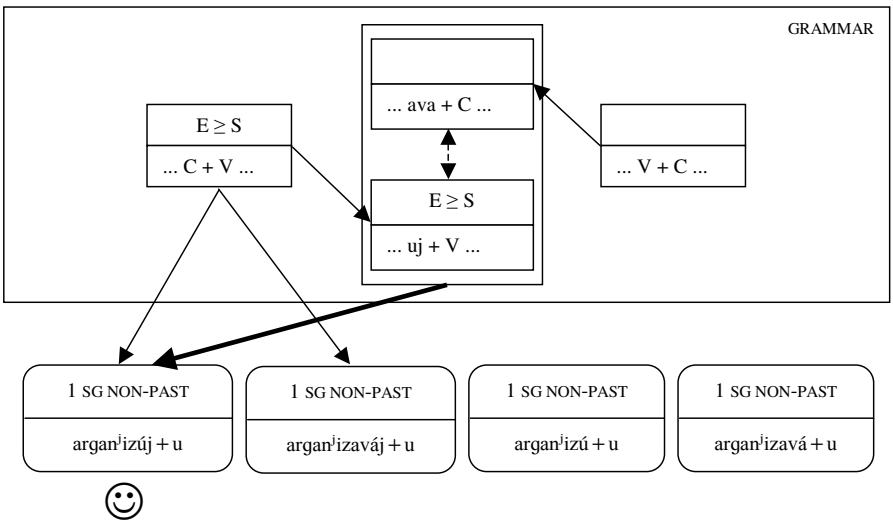

Figure 5.14. Schema interaction for *organizuju* 'I organize' (with second-order schema)

Figure 5.14 contains all the candidates and schemas from Figure 5.13, but in addition displays a second-order schema in the middle. The upper part of the second-order schema has stem final [ava] followed by a C-initial ending, which

is characteristic of the past tense and infinitive subparadigms. The lower part of the second-order schema represents the present tense subparadigm, which has non-past meaning and [uj] followed by a C-initial ending.[57] The two parts of the second-order schema are connected by means of a double-headed extension arrow capturing the bi-implicational relationship in (13). The leftmost candidate is compatible with the second-order schema. This schema is the only schema that specifies exactly which segments precede the ending, so it is more specific than the other schemas in the grammar fragment. The instantiation arrow connecting the second-order schema and the leftmost candidate is therefore thicker than the other instantiation arrows in the figure. Since the thickest arrow points at the leftmost candidate, and since this is the only candidate that instantiates two schemas, the principle of conceptual overlap predicts the candidate to the left to be the winner. This prediction is borne out by the facts as indicated by the smiling face.

Figure 5.14 shows that Cognitive Grammar facilitates an account of the [uj] ~ [ava] alternation in Russian verbs, insofar as the correct candidate is selected as the winner. However, it is worth pointing out that in addition the analysis explicates the relationship between the [uj] ~ [ava] verbs and the default pattern discussed earlier in this chapter. The instantiation arrow pointing at the upper portion of the second-order schema shows that [ava+C] is compatible with the more general V+C pattern of the rightmost schema. There is also a solid arrow from the leftmost schema to the lower portion of the second-order schema showing that [uj+V] is an instantiation of the more general C+V pattern. In other words, these instantiation arrows show that the [uj] ~ [ava] pattern is more specific, but nevertheless compatible with the default pattern represented in the leftmost and rightmost schemas. In sections 6.2, 7.5 and 7.7, we shall consider similar situations in more detail; at this point it is sufficient to notice that the [uj] ~ [ava] alternation reinforces the default pattern and thus lends additional support to the analysis developed earlier in this chapter.

While second-order schemas have been referred to several times in the preceding chapters, Figure 5.14 is the first figure depicting the interaction of such schemas and other schemas. A few remarks on notation are therefore in order. The figure is simplistic in one respect. The second-order schema involves an alternation between two forms, whereas the related candidate represents only one form – the 1 singular present tense. Strictly speaking, therefore, the candidate

57 I ignore the imperative subparadigm. As shown in Table 5.2, the imperative forms do not have V-initial endings despite the predictions of the analysis proposed in this chapter. As mentioned in section 5.1, we shall return to imperatives of this sort in chapter 8. They enable us to shed light on phonological opacity, but this theoretically important issue does not have a bearing on the problem under scrutiny here.

is not an instantiation of the second-order schema as a whole. Two more precise formats are given in Figure 5.15. In the version to the left, the instantiation arrow connects the candidate with the lower part of the second-order schema, not the second-order schema as a whole. In other words, the candidate is characterized as an instantiation of a schema that is related to another schema that is part of the same second-order schema. The alternative version to the right in Figure 5.15 involves a more complex candidate displaying an alternation between two forms. In this way, we capture the fact that an alternation between a 1 singular present tense form [argan^{j}izúju] and a masculine singular past tense form [argan^{j}izavál] is compatible with the schema for the [uj] ∼ [ava] alternation. I shall not explore the implications of the two formats in Figure 5.15; in the following, I shall employ the simplified format in Figure 5.14, which is sufficiently precise for the purposes of this book.

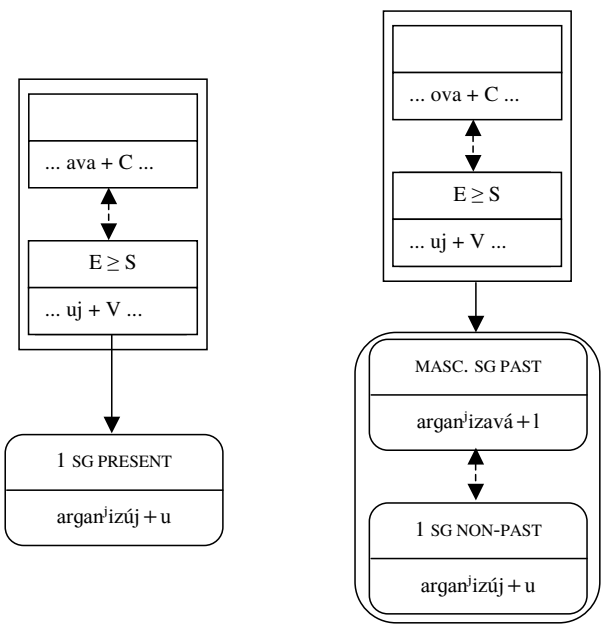

Figure 5.15. Instantiation of second-order schemas – alternative formats

5.7. Conclusion

This chapter has addressed two issues. First and foremost, I have developed a theory of alternations in Cognitive Grammar, where structured category networks account for the relationships between the alternants and the environment conditioning the alternation. The theory furthermore accommodates productivity and the difference between prototypical and peripheral patterns. Second, I have given a detailed analysis of the truncation alternation in terms of bipolar schemas rather than underlying representations and procedural rules. The proposed analysis has contributed to the One-Stem/Two-Stem System controversy – a long-standing issue in Slavic linguistics. I have argued that Cognitive Grammar facilitates a synthesis between the two approaches, insofar as it enables us to incorporate both the form-based generalizations underlying the Jakobsonian One-Stem System and the meaning-based generalizations implicit in the Two-Stem System. In the terminology developed in this chapter, the truncation analysis is not phonologically or semantically conditioned, but rather displays symbolic conditioning.

This chapter has focused on the default patterns. However, a full-fledged analysis must also take into account several special cases involving the infinitive, past tense and imperative subparadigms. These issues will be explored in chapters 6 through 8, which focus on the theoretical problems of neutralization, abstractness, phonological opacity and product-oriented generalizations.

Chapter 6
Neutralization and phonology-morphology interaction: Exceptional infinitive

One of the main topics of this book is the interaction of phonology and morphology in Cognitive Grammar. In this chapter, I address this topic on the basis of a detailed analysis of neutralization in exceptional infinitives. We shall see that neutralization can be accounted for in terms of schemas, and that this approach accommodates neutralization not only in phonological, but also in morphological environments. The interaction between phonological and morphological neutralization can be represented as categorizing relationships connecting the schemas in the grammar where phonology and morphology do not occupy different autonomous modules, but rather constitute parts of a continuum of symbolic structures. No extra, ad hoc machinery is employed in the analysis, which is based on the cognitively motivated structures used elsewhere in this book.

My account of the exceptional infinitives elaborates on the analysis of the default patterns in chapter 5. The exceptions are systematic in that they form two well-defined classes, which are characterized in part morphologically as non-suffixed verbs and in part phonologically as involving dorsal plosives or the whole class of obstruents. The classes constitute a nested structure in that the global default from chapter 5 is overridden by a local default, which in turn is overridden by the most specific statement concerning the smallest class of verbs. The analysis resolves an apparent segmentation paradox by means of a combination of categorizing relationships and the integration relation.

6.1. Data and descriptive generalizations

Chapter 5 showed that the V+C schema is characteristic for the past tense and infinitive subparadigms. In other words, we expect infinitives to have a V-final stem followed by a C-initial ending. This prediction is borne out for suffixed verbs like [dʲéla+tʲ] 'do' and [pʲisá+tʲ] 'write', as well as for non-suffixed verbs like [mi+tʲ] 'wash' and [sta+tʲ] 'become'. Notice that [mi+tʲ] and [sta+tʲ] have sonorants in stem-final position in the present tense, as witnessed by the 3 pl present tense forms [mój+ut] and [stán+ut], and that these sonorants are absent in the past tense and infinitive forms. However, non-suffixed verbs in obstruents are different. In infinitives like [grʲisʲ+tʲí] 'row' and [grisʲ+tʲ] 'gnaw', for instance, the stem ends in a consonant despite the following C-initial ending.

The purpose of this section is to show that deviations from the default pattern are predictable from the morphological and phonological properties of the stem, and to formulate descriptive generalizations that will underlie the theoretical discussions in sections 6.2 and 6.3.

As a first approximation, consider the following generalization:

(1) In order for a consonant to occur stem-finally before a consonant-initial ending, it must be
   a. part of the root, and
   b. an obstruent.

What this means is that the exceptional C+C cluster only occurs in non-suffixed verbs. In such verbs, the stem consists of a bare root, so the stem-final consonant is at the same time root-final. Furthermore, the stem- and root-final consonant must be an obstruent. Before we consider the relevant verbs in more detail, I would like to point out that both the morphological and phonological parts of (1) represent natural generalizations. From a typological perspective, therefore, the exceptional behavior of infinitives like [grʲisʲ+tʲí] and [grisʲ+tʲ] is not entirely unexpected. With regard to morphology, it has often been observed that roots tend to involve more marked structure than affixes cross-linguistically. In Optimality Theory this generalization has been captured by McCarthy and Prince's "Root-Affix Faithfulness Metaconstraint" (cf. e.g. McCarthy and Prince 1995: 17 and references there), which states that faithfulness to roots are universally ranked higher than faithfulness to affixes. Technicalities aside, this means that roots are more protected from phonological processes than affixes are. Ussishkin and Wedel (2001) present psycholinguistic evidence that offers functional grounding for the root-affix markedness distinction. The behavior of the non-suffixed verbs in Russian complies with the cross-linguistic pattern, insofar as retaining the root-final consonant yields consonant clusters in an environment where normally only the less marked V+C or C+V structures are permitted.

The phonological part of (1), the fact that obstruents "survive" in a position where sonorants do not, gains similar support. Obstruents occupy positions higher up than sonorants in a hierarchy of consonant strength (cf. e.g. Kirchner 1998: 17 and references there), which captures the cross-linguistic generalization that obstruents are more resistant against lenition and deletion. In this way, the behavior of the obstruent-final verbs in Russian is in harmony with a well-established cross-linguistic tendency.

With regard to the infinitive, non-suffixed verbs in obstruents form two classes: those where the stem in the present tense ends in the dorsal plosives [k, g], and those where the stem ends in other obstruents. We shall consider

the latter class first; a complete list based on the Academy Grammar (Švedova (ed.) 1980: 657–658) is given in Table 6.1.[58] The verbs are sorted according to the stem-final consonant in the present tense (as represented by the 3 pl present tense) and the list also gives the shape of the stem in the infinitive and the past tense. Two points are important. First, the table shows that all the obstruent-stem verbs have [sʲ] in stem-final position in the infinitive; [grʲisʲ+tʲí] and [grisʲ+tʲ] are therefore far from idiosyncratic exceptions. Secondly, the infinitives in Table 6.1 display neutralization in the sense discussed in sections 3.7–3.9. In the present tense, there is an opposition between a variety of segments in stem-final position, but in the infinitive all the verbs have stem-final [sʲ]. Since an opposition is neutralized in the infinitive, I shall refer to this pattern as the "neutralization pattern". Here is an overview of the alternations between the present tense and infinitive subparadigms:

(2) [b] ~ [sʲ] (e.g. *gresti* 'row')
[d] ~ [sʲ] (e.g. *vesti* 'lead')
[t] ~ [sʲ] (e.g. *mesti* 'sweep')
[s] ~ [sʲ] (e.g. *nesti* 'carry')
[z] ~ [sʲ] (e.g. *vezti* 'transport')

Table 6.2 provides a full list of non-suffixed verbs in the dorsal plosives [k, g] (cf. Švedova (ed.) 1980: 657). As can be seen from the table, the stem-final dorsal consonant is attested in both present and past tense forms, but the infinitive ends in the affricate [tʃʲ]. This segment can be considered an example of coalescence of the stem-final dorsal and the infinitive ending [tʲ(i)]. In the following I shall use "merger" as a label for the pattern in order to distinguish it from the pattern discussed above. Merger is closely related to neutralization; when two segments coalesce, the number of oppositions that can be maintained is reduced. In the case at hand, notice in particular the neutralization of the voicing contrast. The

58 I disregard the highly irregular verb *idti* 'walk', which represents an isolated exception as far as the infinitive is concerned. Most verbs in Tables 6.1 and 6.2 combine with several prefixes, but I list only non-prefixed verbs. However, for verbs that combine with several prefixes, but normally do not occur without a prefix, I give a prefix in parentheses. Notice that non-suffixed verbs have softening alternations in the present tense subparadigm. In the table I only list present tense forms with hard alternants. We shall return to the softening alternations in chapters 9 and 10. Two different infinitive endings occur in Table 6.1: [tʲ] and [tʲi]. The distribution of these endings is beyond the scope of this book. Notice, however, that [tʲi] is only attested in verbs with end stress.

Table 6.1. Non-suffixed verbs in non-dorsal obstruents

	Infinitive		3 pl present		Fem. sg past		Gloss:
b	gr^{j}is^{j}	+ t^{j}í	gr^{j}ib	+ út	gr^{j}ib	+ lá	*gresti* 'row'
	skr^{j}is^{j}	+ t^{j}í	skr^{j}ib	+ út	skr^{j}ib	+ lá	*skresti* 'scrape'
d	klas^{j}	+ t^{j}	klad	+ út	klá	+ la	*klast'* 'lay'
	kras^{j}	+ t^{j}	krad	+ út	krá	+ la	*krast'* 'steal'
	pas^{j}	+ t^{j}	pad	+ út	pá	+ la	*past'* 'fall'
	s^{j}es^{j}	+ t^{j}	s^{j}ád	+ ut	s^{j}é	+ la	*sest'* 'sit down'[59]
	jes^{j}	+ t^{j}	jid^{j}	+ át	jé	+ la	*jest'* 'eat'
	vis^{j}	+ t^{j}í	v^{j}id	+ út	v^{j}i	+ lá	*vesti* 'lead'
	bl^{j}us^{j}	+ t^{j}í	bl^{j}ud	+ út	bl^{j}u	+ lá	*bljusti* 'watch over'
	br^{j}is^{j}	+ t^{j}í	br^{j}id	+ út	br^{j}i	+ lá	*bresti* 'trudge'
	pr^{j}as^{j}	+ t^{j}	pr^{j}id	+ út	pr^{j}i	+ lá	*prjast'* 'spin'
t	gn^{j}is^{j}	+ t^{j}í	gn^{j}it	+ út	gn^{j}i	+ lá	*gnesti* 'oppress'
	m^{j}is^{j}	+ t^{j}í	m^{j}it	+ út	m^{j}i	+ lá	*mesti* 'sweep'
	abr^{j}is^{j}	+ t^{j}í	abr^{j}it	+ út	abr^{j}i	+ lá	*obresti* 'find'
	pl^{j}is^{j}	+ t^{j}í	pl^{j}it	+ út	pl^{j}i	+ lá	*plesti* 'braid'
	(ras)sv^{j}is^{j}	+ t^{j}í	(ras)svit^{j}	+ ót	(ras)sv^{j}i	+ ló	*rassvesti* 'dawn'[60]
	tsv^{j}is^{j}	+ t^{j}í	tsv^{j}it	+ út	tsv^{j}i	+ lá	*cvesti* 'flower'
	(u)tʃ^{j}es^{j}	+ t^{j}	(u)tʃ^{j}t	+ út	(u)tʃ^{j}	+ lá	*učest'* 'take into account'[61]
z	v^{j}is^{j}	+ t^{j}í	v^{j}iz	+ út	v^{j}iz	+ lá	*vezti* 'transport'
	gris^{j}	+ t^{j}	griz	+ út	gríz	+ la	*gryzt'* 'gnaw'
	l^{j}es^{j}	+ t^{j}	l^{j}éz	+ ut	l^{j}éz	+ la	*lezt'* 'climb'
	pals^{j}	+ t^{j}í	palz	+ út	palz	+ lá	*polzti* 'crawl'
s	n^{j}is^{j}	+ t^{j}í	n^{j}is	+ út	n^{j}is	+ lá	*nesti* 'carry'
	pas^{j}	+ t^{j}í	pas	+ út	pas	+ lá	*pasti* 'graze'
	tr^{j}is^{j}	+ t^{j}í	tr^{j}is	+ út	tr^{j}is	+ lá	*trjasti* 'shake'

infinitive has voiceless [tʃ^{j}], regardless of whether the stem ends in a voiced [g] or a voiceless [k].

59 This verb involves a highly irregular vowel alternation in the stem that will not be discussed in this book.

60 This verb is limited to impersonal constructions and does not occur in the 3 pl present tense or feminine sg past tense. In the table I therefore give the 3 sg present tense and the neuter past tense for this verb.

61 In the present and past tenses, the stem does not have a vowel at all. Vowels engaging in vowel ∼ zero alternations of this type are traditionally referred to as "mobile

Table 6.2. Non-suffixed verbs in dorsal plosives

	Infinitive	3 pl present tense		Fem. sg past tense		Gloss
k	vlʲetʃʲ	vlʲik	+ út	vlʲik	+ lá	*vleč'* 'draw'
	valótʃʲ	valak	+ út	valak	+ lá	*voloč'* 'drag'
	pʲetʃʲ	pʲik	+ út	pʲik	+ lá	*peč'* 'bake'
	(ab)rʲétʃʲ	(ab)rʲik	+ út	(ab)rʲik	+ lá	*obreč'* 'condemn'
	sʲetʃʲ	sʲik	+ út	sʲik	+ lá	*seč'* 'flog'
	tʲetʃʲ	tʲik	+ út	tʲik	+ lá	*teč'* 'flow'
	talótʃʲ	talk	+ út	talk	+ lá	*toloč'* 'crush'
g	bʲirʲétʃʲ	bʲirʲig	+ út	bʲirʲig	+ lá	*bereč'* 'take care'
	zˌetʃʲ	zg	+ út	zg	+ lá	*žeč'* 'burn'
	lʲetʃʲ	lʲág	+ ut	lʲig	+ lá	*leč'* 'lie down'[62]
	motʃʲ	móg	+ ut	mag	+ lá	*moč'* 'be able'
	prʲinʲibrʲétʃʲ	prʲinʲibrʲig	+ út	prʲinʲibrʲig	+ lá	*prenebreč'* 'scorn'
	(za)prʲátʃʲ	(za)prʲig	+ út	(za)prʲig	+ lá	*zaprjač'* 'harness'
	stʲirʲétʃʲ	stʲirʲig	+ út	stʲirʲig	+ lá	*stereč'* 'watch over'
	strʲitʃʲ	strʲig	+ út	strʲíg	+ la	*strič'* 'cut'

Why say that the merger pattern represents an exception from the default pattern discussed in the previous chapter? After all, infinitives like [pʲetʃʲ] 'bake' end in the affricate [tʃʲ] preceded by a vowel. Isn't that in harmony with the default V+C schema? Remember that the default schema involves a morpheme boundary; the vowel belongs to the stem and the consonant to the ending. As mentioned above, the [tʃʲ] in the infinitives in Table 6.2 can be regarded as an example of coalescence of the stem-final dorsal and the [tʲ] of the regular infinitive ending. In section 6.3, we shall see that it is therefore problematic to segment infinitives like [pʲetʃʲ] into morphemes in a principled manner. In this (admittedly subtle) way, the merger pattern deviates from the default pattern.

Are the neutralization and merger patterns predictable? Both patterns are restricted to non-suffixed verbs, i.e. verbs where the stem consists of a bare root. However, this morphological feature is not sufficient to predict the behavior of the relevant verbs in the infinitive, since non-suffixed verbs in sonorants like [sta+tʲ] 'become' and [mi+tʲ] 'wash' follow the default pattern described in chapter 5. Clearly, therefore, it is necessary to supplement the morphological

vowels" in Slavic linguistics. Another verb with a mobile vowel is *žeč'* '*burn'* in Table 6.2. Mobile vowels will not be discussed in the present study.

characterization by phonological features. For the neutralization pattern, the feature [obstruent] is sufficient to single out the relevant verbs. With regard to the merger pattern, I suggest characterizing the stem-final consonants as dorsal plosives. This distinguishes [k, g] from all other consonants in Russian. Since there are no Russian verbs in [x], it would be sufficient to refer to the stem-final consonants in the merger pattern as dorsal *obstruents*. However, for the purposes of the present study I shall employ the term "plosive" which yields the more precise description. The generalizations for the merger and neutralization patterns, as well as the default pattern from chapter 5 can be summarized as follows, where the generalization for the smallest group is mentioned first and the generalization for the largest group last:

(3) Generalizations:
   a. Non-suffixed verb, stem-final dorsal plosive:
      inf. in [tʃʲ] [pʲetʃʲ] 'bake'
   b. Non-suffixed verb, stem-final obstruent:
      inf. in [s+tʲ(i)] [grʲisʲ+tʲí] 'row'
   c. Elsewhere:
      inf. in V + [tʲ] [dʲéla+tʲ] 'do'

Notice that the generalizations are organized as overrides and defaults constituting a nested structure where (3a) refers to a subset of the verbs covered by (3b), which in turn refers to a subset of the verbs covered by (3c). The statement in (3c) represents the global default, which is overridden by (3b). This statement is the local default for non-suffixed verbs, but is overridden by the more specific (3a). Notice that assuming (3b) to be overridden by (3a) enables us to state (3b) in a simple and straightforward manner. Without this assumption one would be forced to adopt a cumbersome description of the class of segments, say, "obstruents except dorsal plosives".

In view of the fact that the data in Tables 6.1 and 6.2 represent small classes and non-productive patterns in Contemporary Standard Russian, one might argue that we are dealing with idiosyncrasies of little relevance for the structure of the Russian grammar. It is possible that language users learn all the relevant verbs by rote without making any generalizations. However, Bybee (2001: 29, 121 and 124) discusses psycholinguistic evidence suggesting that speakers can make generalizations about classes comprising as few as six words. Since I am not aware of any evidence indicating that the neutralization and merger patterns are rote-learned, and since, as we have seen in (3), it is possible to state simple generalizations involving natural segment classes, I shall take these generalizations as the point of departure for the following discussion. The questions are whether and how the generalizations in (3) can be accommodated in Cognitive

Grammar, and whether this framework offers an insightful account of neutralization and the interaction between morphology and phonology in general. In section 6.2, we shall consider the neutralization pattern, before we turn to the more complex merger pattern in section 6.3.

6.2. Neutralization and morphology-phonology interaction: Stems in non-dorsal obstruents

What makes the neutralization pattern particularly interesting from a theoretical perspective is that it reflects the interaction of the morphology with two phonological phenomena, viz. devoicing and softening assimilation. As shown in section 3.7, Russian devoices obstruents before voiceless obstruents. The specification [voiceless] of the stem-final [s^{j}] in an infinitive like [gr^{j}is^{j}+t^{j}í] is predictable from the phonological environment; a voiced obstruent before [t^{j}] would not be possible in Russian. The specification that the consonant is palatalized is likewise predictable from the phonological environment, because Russian has regressive softening assimilation, as discussed in section 3.8. However, the fact that the infinitive displays an alveolar fricative rather than, say, a labial fricative or plosive in stem-final position does not follow from the phonology. There are no restrictions against labial plosives and fricatives before alveolar plosives in Russian, as witnessed by the initial consonants in words like *ptica* 'bird' with a [pt^{j}] group and *vteret'* 'rub in' with [ft^{j}]. The specifications that cannot be attributed to the phonological environment must be due to morphology. The challenge is to explicate the interaction between phonology and morphology in Cognitive Grammar.

Devoicing and softening assimilation were discussed in some detail in chapter 3; at this point it is sufficient to repeat the schemas I proposed there. The schema to the left in Figure 6.1 captures the generalization that Russian has devoicing of obstruents before voiceless obstruents. The upper portion of the schema shows that adjacent voiceless obstruents are attested in Russian; the absence of schemas for a voiced obstruent followed by voiceless obstruent shows that such clusters do not occur. The elaboration site in the lower portion of the schema indicates that it is the second member of the cluster that forces the preceding consonant to be voiceless. In this way, we capture the fact that devoicing is regressive.

The schema to the right in Figure 6.1 represents the generalization that a palatalized alveolar plosive requires that a preceding alveolar plosive be palatalized. The upper portion of the schema states that clusters consisting of two palatalized alveolar plosives are well-formed in Russian. For simplicity, I use

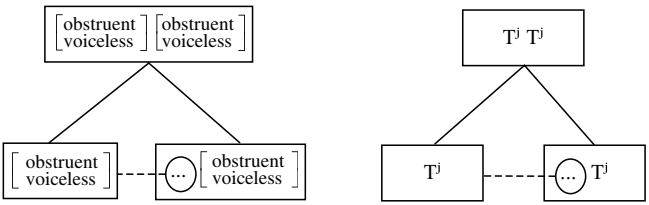

Figure 6.1. Schemas for devoicing (left) and softening assimilation (right)

a capital T with a superscript ^{j} to represent palatalized alveolar plosives. The elaboration site in the lower portion of the schema clarifies that softening assimilation is regressive. In section 3.8, I pointed out that softening assimilation is losing ground in present-day Russian. However, for the purposes of this study we shall only be concerned with the standard pronunciation where softening assimilation is intact, i.e. where the schema to the right in Figure 6.1 is part of the grammar.

Since Russian has regressive devoicing and softening assimilation, it is clear that the schemas in Figure 6.1. are necessary in an adequate analysis of Russian. However, they are not sufficient to account for the shape of the stem in the infinitive. This is shown in Figure 6.2, which compares four candidates for the infinitive of the verb meaning 'row' with the two phonological schemas for devoicing and softening assimilation. In order to save space I have only included the upper boxes of the phonological schemas. The candidates have different stem-final consonants. As shown in the figure, the three leftmost candidates are instantiations of the devoicing schema in that they all have a voiceless consonant before the infinitive ending. The three rightmost candidates instantiate the softening schema since they have palatalized alveolar obstruents in stem-final position. The two candidates in the middle are instantiations of both phonological schemas, so the phonology is not sufficient to select the correct infinitive.[63]

In order to choose between the two candidates in the middle, we need to supplement the phonological schemas by a morphological schema for the infinitive. Such a schema is given between the phonological schemas in Figure 6.2. Since this schema involves stem-final [s^{j}] in the infinitive, it is only compatible with the second candidate from the left. This candidate is the only candidate instan-

63 Notice that the second candidate from the right has [t^{j}] in stem-final position, which in front of the identical consonant in the ending will be interpreted as a geminate. The candidate can be considered phonologically well-formed as there is no general ban on geminates in Russian (cf. e.g. Avanesov 1984: 168–178).

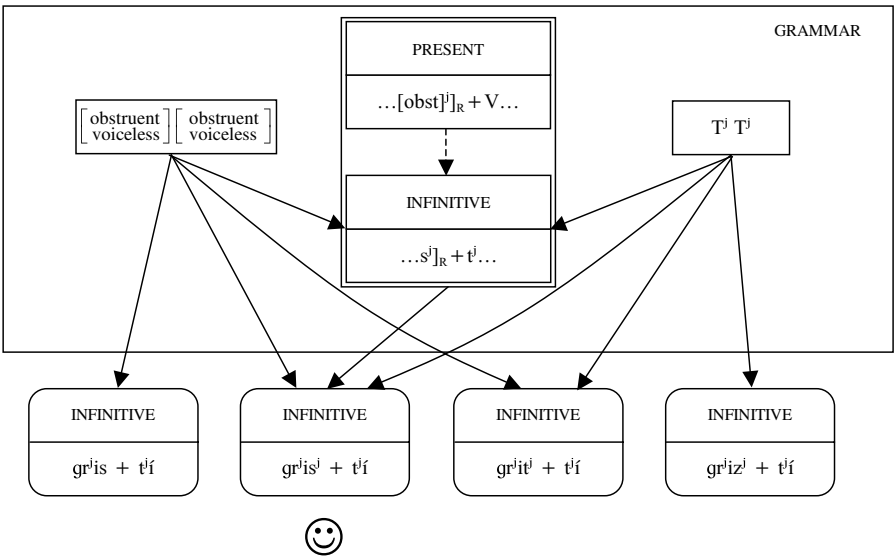

Figure 6.2. Phonology and morphology interaction in the infinitive of *gresti* 'row'

tiating all three schemas, and it is therefore correctly selected as the winner on the basis of conceptual overlap.

The morphological schema is a second-order schema specifying that verbs with any obstruent in the present tense subparadigm have [sʲ] in the infinitive.[64] As the reader will recall from section 6.1, this pattern is restricted to non-suffixed verbs, i.e. verbs where the stem consists of a bare root. In section 4.4, I showed how this structure can be represented in Cognitive Grammar by means of Langacker's (1987: 75) integration relation. However, for present purposes a simplified notation is sufficiently precise, so in Figure 6.2, the right edge of the root is represented as $]_R$. Since the right edge of the root is placed immediately before the inflectional ending, it is clear that we are dealing with a stem that lacks a verbal suffix, i.e. that it consists of a bare root.

64 The superscript ^{j} after [obst(ruent)] in the upper portion of the second-order schema indicates palatalization of the stem-final obstruent in the present tense. Non-suffixed verbs like *gresti* have a softening alternation in the present tense subparadigm; compare, for instance, the 3 sg [grʲibʲ+ót] with palatalized [bʲ] and 3 pl [grʲib+út] with non-palatalized [b]. In chapter 10 I shall argue that the palatalized consonant is the default for the stem-final consonant in the relevant class of verbs, and palatalization is therefore included in Figure 6.2. This decision, however, has no bearing on the problem under scrutiny in the present chapter.

In chapter 3, we saw that Cognitive Grammar offers a simple account of neutralization in phonology. Figure 6.2 shows that the framework facilitates an equally straightforward analysis of neutralization in the infinitive, i.e. in a morphologically defined environment. The second-order schema makes explicit that the stem-final obstruent in the present tense corresponds to [s^{j}] in the infinitive. It is worth mentioning that the second-order schema in Figure 6.2 parallels the schemas proposed for the phonological phenomenon of vowel reduction in section 3.9. In other words, no additional ad hoc machinery is required in order to accommodate neutralization in morphology.

I started this section by pointing out that the infinitive of non-suffixed verbs involves the interaction between morphology and phonology. The grammar fragment in Figure 6.2 enables us to accommodate this interaction straightforwardly. Notice, in particular, that there are instantiation arrows from the phonological schemas to the lower portion of the morphological schema that concerns the infinitive. These relations make explicit the fact that infinitives with the consonant cluster [s^{j}t^{j}] conform to the requirements of regressive devoicing and softening assimilation. The morphological schema involves further specification of the phonological generalizations in a morphologically defined environment. The fact that in Cognitive Grammar phonological and morphological generalizations do not pertain to different, autonomous modules, but rather represent interrelated schemas in one grammar enables us to account for the close relation between the phonology and the morphology of Russian infinitives. In Cognitive Grammar the phonology-morphology interaction can be represented by means of categorizing relationships between schemas. In other words, no extra, ad hoc machinery is required.

The morphological schema in Figure 6.2 specifies that the infinitive has [s^{j}] in stem-final position. It would be possible to further simplify the schema. The phonological schemas state that the stem-final consonant is voiceless and palatalized. Since these features are taken care of by the phonology, they could have been omitted in the morphological schema, thus reducing redundancy in the grammar. Would a grammar with less redundancy be better? The answer might not be the same from the perspectives of the speaker and the linguist. While the latter may prefer simple grammars without redundancy, psycholinguistic evidence suggests that speakers are not bothered by redundancy in their mental grammars (cf. e.g. Bybee 2001: 40–49 and Dąbrowska 2004: 18–22 for discussion). In consequence, the answer to the question depends on the purpose of the analysis – whether the aim is to model the mental grammar of the speakers, or whether it is to extract a maximally simple system from the data. Both aims would seem legitimate in different contexts, and it is therefore interesting to note that Cognitive Grammar facilitates both types of analysis.

6.3. Merger and segmentation: Stems in dorsal plosives

The merger pattern introduced in section 6.1 presents the analyst with what looks like a segmentation paradox:

(4) An adequate analysis of the infinitive of non-suffixed verbs with dorsal plosives in stem-final position presupposes segmentation, but at the same time it is impossible to segment the infinitive of these verbs in a principled way.

In the following I shall argue that Cognitive Grammar resolves the paradox. In chapter 4, I showed that Cognitive Grammar can represent segmentation by means of the integration relation, but at the same time the framework captures generalizations in terms of categorizing relationships, which do not presuppose segmentation. I shall take advantage of this flexibility and analyze the merger pattern by means of a second-order schema where one part involves segmentation and one does not.

Why is segmentation necessary? Recall from (3a) above that the generalization we want to capture is that the merger pattern occurs in verbs that are (i) non-suffixed and (ii) have a dorsal plosive in stem-final position. This generalization presupposes that a verb can be divided into a stem and an ending, and that it is possible to locate a segment at the right edge of the stem. In other words, the verb is segmented and there is a clear-cut boundary between stem and ending.

Since we need segmentation in order to account for the merger pattern, we must ask how to segment infinitives like *peč'* 'bake'. This is where the problems start. It appears that two segmentations are possible and that both have advantages. However, if we adopt one analysis, we lose the advantages with the alternative – and vice versa. The challenge is to incorporate the advantages of both segmentations in one analysis. The alternatives we need to consider are [pʲetʃʲ+Ø] and [pʲe+tʃʲ].[65] The first alternative, [pʲetʃʲ+Ø], has the advantage of enabling us to capture the similarity between the infinitive stem and the stem in the other forms of the paradigm, where it always ends in a consonant. In the present tense, verbs like *peč'* have a softening alternation between [k] and [tʃʲ] in stem-final position, so [tʃʲ] in this position is not unprecedented. The alternative segmentation [pʲe+tʃʲ] has the advantage that it captures the similarity between *peč'* and other infinitives. In Russian, the infinitive always has an ending, and we would expect this to hold for verbs like *peč'* too. Furthermore, the infinitive ending in other verbs starts with [tʲ], a segment that is closely related to the [tʃʲ]

65 Notice that [tʃʲ] stands for an affricate that represents one segment, so the segmentation [pʲet+ʃʲ] is not an option.

in verbs like *peč'*. Both [tʲ] and [tʃʲ] have the features [obstruent], [voiceless] and [palatalized], and both segments are articulated with a complete closure in the alveo-palatal region. Notice that alternations between [tʲ] and [tʃʲ] occur in the Russian verbal system, e.g. in the verb *tratit'* 'spend' with the 1 singular present tense [trátʃʲ+u] and the 2 singular present tense [trátʲ+iş].

In a nutshell, the problem can be stated as follows. We need to analyze [tʃʲ] as part of the stem in order to capture the relation between *peč'* and the other forms in its paradigm. However, at the same time we are forced to say that [tʃʲ] is the ending if we want to accommodate the similarity between *peč'* and other infinitives. But how can [tʃʲ] both be part of the stem and not part of the stem at the same time? In an approach with abstract underlying representations one might for instance assume /pʲok+tʲi/ underlyingly, and then have rules merge the /k+tʲ/ sequence to [tʃʲ] so as to create the affricate that obfuscates the morpheme boundary on the surface. An analysis along these lines would mimic the historical development, but would it be adequate as a synchronic account of present-day Russian? I shall not pursue this question, since such an analysis cannot be adopted in Cognitive Grammar, which does not assume underlying representations.

As an alternative solution, I propose invoking categorizing relationships, which, as shown in section 4.4, express similarities without presupposing segmentation. Consider the categorization network in Figure 6.3 where the infinitive of *peč'* is related to other forms in the paradigm as well as to the infinitives of other verbs. The schemas in the left portion of the network portray the relations to the infinitives in [sʲtʲi], [sʲtʲ] and V + [tʲ]. The figure contains a schema for all the infinitives involving [tʲ] and a more general schema at the top left that brings together infinitives with [tʲ] and [tʃʲ]. I represent the bundle of features that [tʲ] and [tʃʲ] share as a Greek τ with a superscript ʲ to indicate palatalization. The schema at the top left captures the generalization that all infinitives involve an alveopalatal, voiceless, palatalized obstruent that is articulated with a complete closure.

The rightmost portion of the network accommodates the relations between the infinitive of *peč'* and other forms of the paradigm. The schemas at the bottom do not cover all forms of the paradigm, but they are sufficient for present purposes. The figure contains one schema for all the forms with the string [pʲVtʃʲ] and one schema for all the forms containing [pʲVk]. The similarities between these strings are explicated in a more general schema at the top right. The segments [tʃʲ] and [k] are not so closely related as [tʃʲ] and [tʲ], but at least they are both voiceless obstruents involving a complete closure relatively far back in the oral cavity. For convenience these shared features are represented by means of a Greek κ in the figure.

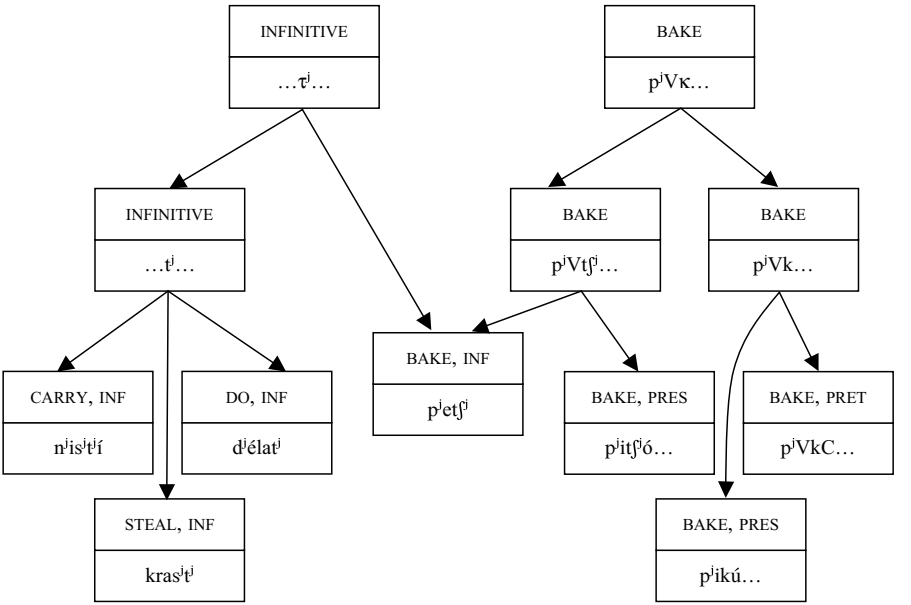

Figure 6.3. Network for the infinitive category and the paradigm of *peč'* 'bake'

In sum, the network in Figure 6.3 accounts for the relations between *peč'* and all other infinitives as well as between *peč'* and the remaining forms in its paradigm. Notice that none of the schemas refer to morpheme boundaries. In other words categorizing relationships facilitate an analysis that incorporates the advantages of both segmentations discussed above – without involving segmentation.

The upshot of the discussion so far is that Cognitive Grammar provides an account of segmentation in terms of integration, and that it is also able to capture generalizations without segmentation. With this in mind we return to the segmentation paradox in (4) above. Can we state the condition that yields a dorsal plosive in stem-final position without segmenting the infinitive? I think we can if second-order schemas are invoked. Consider the rightmost schema in Figure 6.4. The upper portion of this schema represents the present tense forms with a dorsal plosive, which for convenience is represented as a Latin capital K. The relevant forms are the 1 singular with the ending [u] and 3 plural with the ending [ut], so it is possible to include the generalization that the ending begins with [u] in the forms in question. The forms are segmented. The + sign stands for the boundary between stem and ending. The indexed square bracket $]_R$ shows that the right edge of the root and the stem coincide, indicating that we are dealing with a non-suffixed verb.

While the upper portion of the second-order schema captures the presence of a stem-final dorsal plosive, the lower portion regards the shape of the infinitive. It says that the verbs in question have infinitives where the last segment is [tʃʲ]. The infinitive is not segmented; no morpheme boundaries are included in the schema. In this way, the second-order schema both incorporates the part of the generalization that requires segmentation and the part where segmentation is problematic. Without introducing any extra, ad hoc theoretical machinery, Cognitive Grammar offers a straightforward solution to the segmentation paradox in (4).

Figure 6.4 represents the interaction of three schemas for the infinitive. The schema to the left captures the global default, i.e. the sequence V+[tʲ] explored in chapter 5. This schema is compatible with the leftmost candidate [pʲe+tʲ] as shown by the instantiation arrow leading from the schema to the candidate. The schema in the middle is the morphological schema explored in some detail in the previous section. The candidate in the middle is an instantiation of this schema since the candidate has [sʲ] in stem-final position. The candidate to the right ends in [tʃʲ], and is therefore compatible with the rightmost schema. The schema to the right covers a subset of the verbs covered by the schema in the middle, which, in turn, covers a subset of the verbs compatible with the schema to the

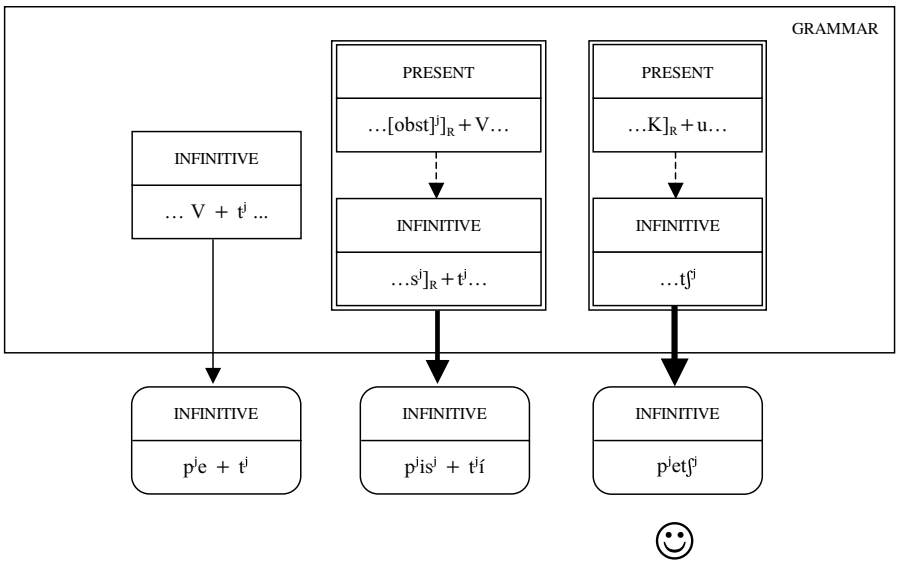

Figure 6.4. Schema interaction in the infinitive of *peč'* 'bake'

left. Since the rightmost schema is most specific, the principle of conceptual overlap correctly predicts that the rightmost candidate is selected as the winner.

6.4. Conclusion

On the basis of a case study of neutralization in exceptional infinitives, this chapter has given a detailed illustration of the interaction of phonology and morphology in Cognitive Grammar. I have shown that neutralization can be accounted for by means of schemas, and that this approach accommodates phonological as well as morphological neutralization. Morphological neutralization involves further specification of phonological generalizations in a morphologically defined environment. Since in Cognitive Grammar phonology and morphology do not constitute separate autonomous modules, it is possible to connect phonological and morphological schemas directly by means of categorizing relationships. In this way Cognitive Grammar offers a straightforward account of the interaction between phonology and morphology, which does not presuppose any theoretical apparatus beyond the cognitively motivated concepts employed elsewhere in this book.

The analysis of the exceptional infinitives in this chapter extends the analysis of the default pattern for the truncation alternation in chapter 5. We have seen that the infinitives represent two classes of systematic exceptions that are defined by phonological and morphological properties. The infinitives form a nested structure where a global default is overridden by a local default, which in turn is overridden by the most specific statement covering the smallest class of verbs. We have seen that the exceptional infinitives present an apparent segmentation paradox, which, however, was resolved in Cognitive Grammar by means of a combination of categorizing relationships and Langacker's integration relation.

Chapter 7
Abstractness and alternatives to rule ordering and underlying representations: Exceptional past tense

How abstract is phonology? How different are underlying representations from the surface structures we can observe? Ever since phonologists became aware of the excessive power of Chomsky and Halle's (1968) SPE model, abstractness has been a recurrent theme in phonological theory. Cognitive Grammar offers a radical and simple answer to the abstractness question. Because the content requirement precludes reference to structures not occurring on the surface (cf. section 2.2.), there are no underlying representations in Cognitive Grammar, and therefore no abstractness in the relevant sense. Does Cognitive Grammar offer a viable alternative to ordered rules and underlying representations? On the basis of a thorough study of exceptional past tense forms, I argue that ordered rules and abstract underlying representations are not necessary, and propose an alternative analysis in terms of schemas connected by categorizing relationships. The approach I advocate is both restrictive and explanatory. The restrictiveness manifests itself in three ways. First, Cognitive Grammar is based on a parsimonious set of concepts, all of which are cognitively motivated. Second, as mentioned, Cognitive Grammar eliminates the abstractness problem and therefore avoids the excessive power of traditional rule-based approaches. Third, instead of referring to underlying representations, the analysis invokes second-order schemas that capture categorizing relationships between forms in the inflectional paradigm. The view adopted in cognitive linguistics of paradigms as structured networks constrains the range of plausible relationships. As for explanatory power, we shall see that instantiation relations between schemas in the grammar provide a key to understanding ongoing linguistic change. In chapter 6, instantiation relations of this sort were used to represent the interaction between phonology and morphology. The fact that Cognitive Grammar accounts for seemingly diverse phenomena like linguistic change and phonology-morphology interaction by means of the same theoretical concepts testifies to the explanatory power of the model and of cognitive linguistics in general.

The analysis of the past tense forms in this chapter complements the analysis of the default V+C pattern described in chapter 5. I show that we are dealing with three well-defined classes that form a nested structure where specific schemas take precedence over local defaults, which in turn override the global default advanced in chapter 5. As in chapter 6, the focus will be on non-suffixed verbs, but I shall also discuss *nu*-drop verbs like *soxnut'* 'dry', which provide additional

support for my argument. After a thorough discussion of the data in 7.1 and 7.2, we shall consider a rule-based analysis in 7.3. Alternative analyses in Cognitive Grammar and their theoretical implications are explored in sections 7.4 through 7.7, before a conclusion is provided in section 7.8.

7.1. Non-suffixed verbs: Data and descriptive generalizations

In this section we shall be concerned with three classes of non-suffixed verbs, which for convenience will be referred to as the *nesti* 'carry', *vesti* 'lead' and *krast'* 'steal' patterns. However, consider first the default pattern represented by *delat'* 'do' in Table 7.1, which lists all the forms in the past tense subparadigm as well as two present tense forms that will prove relevant for the discussion. As can be seen from the table, the stem is [dʲélaj] in the present tense subparadigm, and [dʲéla] in the past tense subparadigm. The absence of the stem-final [j] in the past tense subparadigm (marked as shaded cells in the table) is what we would expect; the analysis developed in chapter 5 predicts a V-final stem before the C-initial endings in the past tense. This prediction is not borne out for the majority of non-suffixed verbs represented by *nesti* 'carry' and *vesti* 'lead' in the table, however. The *nesti* pattern keeps the stem-final consonant intact in all the past tense forms, but on the other hand lacks the (first) consonant in the ending in some of the forms. Notice, in particular, that there is no [l] in the masculine singular and no [f] in the ending of the gerund and past active particle. The *vesti* pattern does not have a consonant in stem-final position in the finite past tense forms, while in the remaining forms the stem is intact. Thus the cells for the finite forms are shaded in the table. Lacking the stem-final consonant in part of the past tense subparadigm, *vesti* occupies an intermediate position between *delat'*, which has no stem-final consonant in any of the past tense forms, and *nesti* which keeps the stem intact throughout the past tense subparadigm. As we shall see in section 7.6, a small set of non-suffixed verbs have developed a pattern that is identical to that of *delat'* in that no consonant is found in stem-final position in the past tense subparadigm. In Table 7.1, this pattern is represented by *krast'* 'steal'. Notice that the past passive participle of the non-suffixed verbs has a vowel-initial ending, before which the stem-final consonant is intact. In this way, the past passive participle behaves like present tense forms, a phenomenon that was discussed in some detail in chapter 5. When in the following I refer to the "past tense subparadigm" or the "non-finite past tense forms", the past passive participles with vowel-initial endings are not included.

Table 7.1. Absence of stem-final consonant in past tense forms (shaded cells)

		delat' 'do'		*nesti* 'carry'		*vesti* 'lead'		*krast'* 'steal'	
Present	3.sg.	dʲélaj	+ it	nʲisʲ	+ ót	vʲidʲ	+ ót	kradʲ	+ ót
	3.pl.	dʲélaj	+ ut	nʲis	+ út	vʲid	+ út	krad	+ út
Past	M.sg	dʲéla	+ l	nʲos		vʲó	+ l	krá	+ l
	F.sg	dʲéla	+ la	nʲis	+ lá	vʲi	+ lá	krá	+ la
	N.Sg	dʲéla	+ la	nʲis	+ ló	vʲi	+ ló	krá	+ la
	Pl	dʲéla	+ lʲi	nʲis	+ lʲí	vʲi	+ lʲí	krá	+ lʲi
	Pass.part.[66]	(z)dʲéla	+ n	(u)nʲisʲ	+ ón	(u)vʲidʲ	+ ón	(u)krádʲ	+ in
	Act.part.	dʲéla	+ ʂij	nʲóʂ	+ ʂij	vʲét	+ ʂij	krá	+ ʂij
	Gerund[67]	(z)dʲéla	+ f	(u)nʲóʂ	+ ʂi	(u)vʲét	+ ʂi	(u)krá	+ ʂi

Table 7.2. Non-suffixed verbs classified according to stem-final consonant (shaded cells lack stem-final consonant)

	Verb	3 pl present tense		Masc. sg past		Past active participle	
b	*gresti* 'row'	grʲib	+ út	grʲop		grʲóp	+ ʂij
	skresti 'scrape'	skrʲib	+ út	skrʲop		skrʲóp	+ ʂij
d	*krast'* 'steal'	krad	+ út	kra	+ l	krá	+ ʂij
	klast' 'lay'	klad	+ út	kla	+ l	klá	+ ʂij
	past' 'fall'	pad	+ út	pa	+ l	pá	+ ʂij[68]
	sest' 'sit down'	sʲád	+ ut	sʲe	+ l	sʲé	+ ʂij
	est' 'eat'	jidʲ	+ át	je	+ l	jé	+ ʂij
	vesti 'lead'	vʲid	+ út	vʲo	+ l	vʲét	+ ʂij
	prjast' 'spin'	prʲid	+ út	prʲa	+ l	prʲát	+ ʂij

66 In the tables throughout this chapter, perfectivizing prefixes are given in parentheses for the past passive participle and the gerund, which are normally formed from perfective verbs. Prefixes in parentheses are also given for verbs that normally do not occur without prefix. For the past active participle, I do not include perfectivizing prefixes, since this participle can be formed from verbs of both imperfective and perfective aspect. However, it should be noted that in some cases the past active participle of imperfective verbs is not widely used.

67 Some of the non-suffixed verbs have developed alternative gerund forms with the ending [a], but they are not listed in Table 7.1, since they do not bear on my argument in this chapter.

68 In addition to the regular participle *pavšij*, there is also an archaic form *padšij*, which is used in the moral sense of 'fallen'.

	Verb	3 pl present tense		Masc. sg past		Past active participle	
	bljusti ‘watch over’	blʲud	+ út	blʲu	+ l	blʲút	+ ʂij
	bresti ‘plod’	brʲid	+ út	brʲo	+ l	brʲét	+ ʂij
	idti ‘walk’	id	+ út	ʂo	+ l	ʂét	+ ʂij
t	*gnesti* ‘oppress’[69]	gnʲit	+ út	gnʲi	+ ló	gnʲót	+ ʂij
	mesti ‘sweep’	mʲit	+ út	mʲo	+ l	mʲót	+ ʂij
	obresti ‘find’	abrʲit	+ út	abrʲó	+ l	abrʲét	+ ʂij
	plesti ‘braid’	plʲit	+ út	plʲo	+ l	plʲót	+ ʂij
	(ras)svesti ‘dawn’[70]	svʲitʲ	+ ót	svʲi	+ ló	—	
	cvesti ‘flower’	tsvʲit	+ út	tsvʲo	+ l	tsvʲét	+ ʂij
	(s)česť ‘count’	tʃʲt	+ ut	tʃʲo	+ l	tʃʲót	+ ʂij[71]
s	*nesti* ‘carry’	nʲis	+ út	nʲos		nʲóʂ	+ ʂij
	pasti ‘graze’	pas	+ út	pas		páʂ	+ ʂij
	trjasti ‘shake’	trʲis	+ út	trʲas		trʲáʂ	+ ʂij
z	*vezti* ‘transport’	vʲiz	+ út	vʲos		vʲóʂ	+ ʂij
	gryzť ‘gnaw’	griz	+ út	gris		gríʂ	+ ʂij
	lezť ‘climb’	lʲéz	+ ut	lʲes		lʲéʂ	+ ʂij
	polzti ‘crawl’	palz	+ út	pols		pólʂ	+ ʂij
k	*vleč’* ‘draw’	vlʲik	+ út	vlʲok		vlʲók	+ ʂij
	voloč’ ‘drag’	valak	+ út	valók		valók	+ ʂij
	peč’ ‘bake’	pʲik	+ út	pʲok		pʲók	+ ʂij
	(ob)reč’ ‘condemn’	rʲik	+ út	rʲok		rʲók	+ ʂij
	seč’ ‘cut’	sʲik	+ út	sʲok		sʲók	+ ʂij
	teč’ ‘flow’	tʲik	+ út	tʲok		tʲók	+ ʂij
	toloč’ ‘crush’	talk	+ út	talók		talók	+ ʂij
g	*bereč’* ‘guard’	bʲirʲig	+ út	bʲirʲók		bʲirʲók	+ ʂij
	žeč’ ‘burn’	zg	+ ut	zọk		zók	+ ʂij
	leč’ ‘lie down’	lʲág	+ ut	lʲok		lʲók	+ ʂij
	moč’ ‘be able’	móg	+ ut	mok		mók	+ ʂij
	prenebreč’ ‘scorn’	prʲinʲibrʲig	+ út	prʲinʲibrʲók		prʲinʲibrʲók	+ ʂij
	(za)prjač’ ‘harness’	prʲig	+ út	prʲak		prʲák	+ ʂij
	stereč’ ‘guard’	stʲirʲig	+ út	stʲirʲók		stʲirʲók	+ ʂij
	strič’ ‘cut’	strʲig	+ út	strʲik		strʲík	+ ʂij

69 According to some dictionaries, e.g. Ožegov and Švedova (1992), this verb is not used in the past tense. However, the neuter form *gnelo* given in Table 7.2 is attested in the Russian National Corpus (www.ruscorpora.ru).

I would like to suggest that it is possible to predict which pattern a verb belongs to on the basis of its stem's morphological structure and sound shape. As for morphological structure, recall from section 4.5 that the Russian verbal stem prototypically contains a derivational suffix, but that some verbs are non-suffixed. Verbs of the *nesti, vesti* and *krast'* patterns are non-suffixed. However, this morphological criterion is not sufficient to predict that a verb follows the *nesti, vesti* or *krast'* patterns, because many non-suffixed verbs follow the default pattern of *delat'* when it comes to the behavior of the stem-final consonant. Compare, for instance, the 3 pl present tense forms [mój+ut] '(they) wash' and [stán+ut] '(they) become' to the masculine sg past tense forms [mi+l] '(he) washed' and [sta+l] '(he) became'. The present tense forms have [j] and [n] in stem-final position, but these consonants are not found in the past tense forms where the ending is C-initial. In other words, past tense forms like [mi+l] and [sta+l] comply with the default V+C pattern. Although there is a systematic exception to which we shall return below, the generalization seems to be that verbs with stem-final sonorants follow the *delat'* pattern, while only verbs with stems in obstruents can behave like *nesti, vesti* or *krast'*.

The properties "non-suffixed" and "obstruent" are sufficient to predict that a verb has an exceptional past tense. However, how can we predict the differences between the *nesti*, *vesti* and *krast'* patterns? Table 7.2, which provides a full list of non-suffixed verbs in obstruents based on the Academy Grammar (Švedova 1980: 657–658) and Zaliznjak (1977), indicates that the distribution of the *nesti* and *vesti* patterns is not random. Non-suffixed verbs behave like *nesti* unless the stem-final obstruent in the present tense forms is one of the alveolar plosives [t] and [d]. As can be seen from the shaded cells in the table, verbs in [t] or [d] lack the stem-final consonant in the finite past tense (e.g. *vesti*), and some verbs in [d] do not have a stem-final consonant in the non-finite past either (cf. the past active participle [krá+fʂij] of *krast'*). As the norms in present-day Russian are somewhat unclear with regard to the *krast'* pattern, it is not simple to pinpoint exactly which verbs follow this pattern. A more detailed analysis will be provided in section 7.6. At this stage I will limit myself to pointing out that the verbs of the *krast'* pattern have unrounded vowels in the stem, while all but one of the *vesti* type verbs have a rounded stem vowel in the masculine sg past

70 Since this verb is only used in impersonal constructions, I give the 3 sg present tense and the neuter singular past tense. This verb does not form participles.

71 According to Zaliznjak (1977) this verb does not have a past active participle, but it is nevertheless included in the table, since the form in question is well documented in actual use, e.g. on the internet. However, since the orthography does not distinguish between [o] and [e] in the relevant environment, it is not clear which vowel occurs in the past active participle.

tense. Furthermore, the *krast'* pattern is only attested for verbs with stem-final [d], while verbs of the *vesti* type may display either [d] or [t] in this position. The descriptive generalizations are summarized in (1). They are organized according to increasing generality. The statement in (1a) concerns the smallest group and (1d) the largest.

(1) a. Non-suffixed, unrounded V, stem-final [d]:
No C in past (e.g. *krast'*)
b. Non-suffixed, stem-final [t, d]:
No C in finite past (e.g. *vesti*)
c. Non-suffixed, stem-final obstruent:
C throughout past (e.g. *nesti*)
d. Elsewhere (any stem-final consonant):
No C in past (e.g. *delat'*)

Notice that subset relations hold between the four generalizations. Verbs with unrounded vowels and stem-final [t, d] are a subset of verbs with stem-final [t, d]. Verbs with stem-final [t, d] constitute a subset of verbs with stem-final obstruents, which in turn form a subset of verbs with consonants in stem-final position. The generalization in (1d) represents the global default for verbs in general, which is overridden by the statement in (1c). The generalization in (1c) is a local default for non-suffixed verbs, but is overridden by the more specific (1b). This statement is the local default for verbs with [t, d] in stem-final position, which is overridden by the most specific (1a).

The concepts of "default" and "override" enable us to capture the generalizations in (1) in a straightforward fashion. For instance, assuming that (1b) overrides (1c), we do not have to mention the fact that (1c) does not apply to stems in [t, d]. The alternative would be to include a more cumbersome statement in the grammar, e.g. "stems ending in obstruents *except* [t, d] keep the stem-final consonant intact in the past tense".

It is possible to state an alternative generalization to the global default in (1d) without adding much complexity to the grammar. If we replace "stem-final consonant" by "stem-final *sonorant* consonant" we still have a statement concerning a natural class of segments, and it is not necessary to add a cumbersome "except . . . " clause. This alternative statement covers exactly the same set of verb stems as (1d), since "sonorant consonants" are the same as "all consonants minus obstruents". Whether speakers prefer (1d) or the more specific alternative, i.e. whether they consider the pattern of *delat'* the global default, is an empirical question and it is possible to shed light on it e.g. by psycholinguistic experiments. Although such evidence is not available, I shall stick to the default-based analysis in (1d) for the purposes of the present study. As argued by Flier (1981),

the *krast'* pattern is the leading edge of a historical change that is still operative in present-day Russian. Since the *krast'* pattern lacks the stem-final consonant in the same forms as *delat'*, it would be difficult to explain this ongoing change without referring to the influence of a global default pattern for consonants in general. As verbs of the *krast'* type have obstruents in stem-final position, one would not expect a pattern restricted to sonorants to have any impact. For this reason, I prefer the statement in (1d) without the addition of the feature [sonorant].

A similar situation holds for (1b). It is possible to replace this statement by a statement referring to verbs with a *rounded* vowel and [t, d]. I am not aware of any psycholinguistic evidence in favor of either variant, but the diachronic facts point in the direction of the default-based solution in (1b). As mentioned, the *krast'* pattern represents an innovation, which is in the process of taking over for what has historically been the general pattern for stems in [t, d], viz. the *vesti* pattern. Since we are dealing with a diachronic process still under way, it is reasonable to let the synchronic analysis correspond closely to the diachronic development. For the purposes of this study I shall therefore adopt the default-based analysis in (1), where the local default for verbs in [t, d] in (1b) is overridden by the more specific generalization in (1a).

Before we move beyond non-suffixed verbs, it is worth pointing out that there is one systematic exception that is not accounted for in (1). The generalizations predict that non-suffixed verbs in sonorants display the global default V+C in the past tense. While this is true in most cases, verbs with stems in a vibrant follow the *nesti* pattern, although the vibrants [r, rʲ] are traditionally classified as sonorants. Past tense forms like [tʲór+la] '(she) rubbed' show that the stem-final vibrant is retained, even though the vibrant is followed by a C-initial past tense ending. It would be possible to supplement the statements in (1) by a separate generalization for the *teret'* 'rub' class, say, "non-suffixed verbs with stem-final vibrant keep this consonant throughout the past tense forms". However, in the following I shall not explore the *teret'* class, which is not productive and only comprises the four verb roots *meret'* 'die', *peret'* 'trudge', *steret'* 'extend' and *teret'* 'rub'. It enjoys a marginal status in the Russian verb system, and it also does not contribute to the theoretical issues under scrutiny in this study.

7.2. More evidence: *Nu*-drop verbs

Hitherto the discussion has revolved around non-suffixed verbs. However, there is another class of verb that is relevant for the generalizations in (1), namely *nu*-drop verbs. In this section, we shall see that no modifications in the analysis are

needed in order to accommodate *nu*-drop verbs. In this way, the *nu*-drop verbs provide additional support for the generalizations discussed in section 7.1.

As pointed out in section 4.5, the stem of *nu*-drop verbs contains the derivational suffix [nu], which however is optional in the past tense forms. It is not necessary to discuss the factors that bear on the absence or presence of the suffix (see, however, Nesset 1998a: 140–148 for discussion with references). What is relevant in the present context is the fact that the forms without [nu] behave like non-suffixed verbs. As can be seen from Table 7.3, [x] in *soxnut'* 'dry' is retained throughout the past tense subparadigm in the same way as [s] in the non-suffixed *nesti*.

Table 7.3. Retained stem-final consonant in past tense forms – *nu*-drop and non-suffixed verbs

		soxnut' 'dry'		*nesti* 'carry'	
Present	3.sg.	sóxnʲ	+ it	nʲisʲ	+ ót
	3.pl.	sóxn	+ ut	nʲis	+ út
Past	M.sg	sox		nʲos	
	F.sg	sóx	+ la	nʲis	+ lá
	N.Sg	sóx	+ la	nʲis	+ ló
	Pl	sóx	+ lʲi	nʲis	+ lʲí
	Pass.part.[72]	—		(u)nʲisʲ	+ ón
	Act.part.	sóx	+ ʂij	nʲóʂ	+ ʂij
	Gerund	(vý)sax	+ ʂi	(u)nʲóʂ	+ ʂi

Since *nu*-drop verbs follow the *nesti* pattern in the past tense, we would expect the *nu*-drop verbs to have the same morphological and phonological properties as the *nesti* type verbs. As for morphology, we saw in section 7.1 that the key word is "non-suffixed"; only stems that consist of a bare root retain the stem-final consonant in the past tense subparadigm. This prediction holds for *nu*-drop verbs as well. In the past tense forms that lack the [nu] suffix have stems consisting of bare roots.

When it comes to phonology, we have seen that the relevant property for the *nesti* pattern is "obstruent". Since *nu*-drop verbs behave like the *nesti* class, on the basis of the analysis developed in the previous section we would expect them to have obstruents in stem-final position. This prediction is borne out by

72 In the past passive participle and the gerund, which are normally formed from perfective verbs, perfectivizing prefixes are given in parentheses. As *soxnut'* is intransitive, it does not have passive participles.

the facts. As can be seen from Table 7.4, which lists all *nu*-drop verbs from the Academy Grammar (Švedova (ed.) 1980) and Zaliznjak (1977), all but two verbs have obstruents.[73] In the exceptions, *stynut'* 'get cool' and *vjanut'* 'fade, wither', the root ends in a vowel. However, as illustrated by the masculine sg past tense forms [sti+l] and [vʲa+l], these verbs comply with the global default V+C pattern in the past tense, so they are not at variance with the analysis developed in the previous section.

In section 7.1, we saw that non-suffixed verbs with stem-final [t, d] follow the *vesti* or *krast'* patterns, rather than the *nesti* pattern. Since *nu*-drop verbs belong to the *nesti* pattern, we would not expect [t, d] in stem-final position in *nu*-drop verbs, or at least we would expect [t, d] to be marginal. As can be seen from Table 7.4, this prediction is borne out by the facts, insofar as there are no *nu*-drop verbs in [t], and only one such verb in [d]: *obrydnut'* 'be boring'. In other words, out of sixty *nu*-drop verbs, only one has an unexpected consonant in stem-final position.

If we dig a little deeper, it becomes even clearer how marginal stem-final [t, d] are. As mentioned above, the two verbs *stynut'* 'get cool' and *vjanut'* 'fade, wither' have V-final stems. However, originally they had [d] in stem-final position (Vasmer 1950-1958), but this consonant has been lost in present-day Russian. For instance, the archaic past active participle *vjadšij* (with stem-final consonant) has been replaced by *vjanuvšij*, where the relevant consonant has been deleted. The only verbs where the stem-final obstruent has been deleted are those with [d], but here the deletion process has affected two out of three verbs. It is as if the *nu*-drop verbs have gotten rid of the unexpected [d] in order to avoid clashing with the *nesti* pattern. As a result, stem-final [d] has been marginalized over time, creating a situation where only *obrydnut'* (a low-frequency verb) remains exceptional. But even this verb is not a full-fledged exception. For one thing, the Academy Grammar notes that it is stylistically marked in that it belongs to substandard Russian ("*prostorečie*", Švedova (ed.) 1980: 652). Furthermore, *obrydnut'* has a defective paradigm in the past tense. According to Zaliznjak (1977), the masculine singular past tense form of this verb is avoided, and this is confirmed by data from the Russian National Corpus.[74] A corpus search carried

73 Some of the verbs in Table 7.4 are more widely used when combined with prefixes. However, as a rule I list non-prefixed verbs only. Only if Zaliznjak (1977) does not include a non-suffixed verb for the relevant root, one of the attested prefixed verbs is listed in Table 7.4.

74 The Russian National Corpus is available on http: //www.ruscorpora.ru/. As of September 2005, when all corpus searches referred to in this chapter were carried out, it contained about 65 million words.

Table 7.4. Complete list of *nu*-drop verbs according to root-final segment

	Verb	Gloss	*Verb*	Gloss
[b]	*slabnut'*	'weaken'	*zjabnut'*	'suffer from cold'
	gíbnut'	'perish'	*drjabnut'*	'become flabby'
[p]	*slepnut'*	'become blind'	*xripnut'*	'become hoarse'
	krepnut'	'get stronger'	*sipnut'*	'become hoarse'
	lipnut'	'stick, adhere'	*terpnut'*	'grow numb'
[d]	*obrydnut'*	'be boring'		
[z]	*isčeznut'*	'disappear'	*gruznut'*	'go down, sink'
	skliznut'	'become slimy'	*zaskoruznut'*	'harden'
	slíznut'	'become slimy'	*vjaznut'*	'stick, sink'
	razverznut'	'open wide'	*grjaznut'*	'sink in the mire'
	merznut'	'feel cold'		
[s]	*gasnut'*	'go out (light)'	*kisnut'*	'turn sour'
	voskresnut'	'resurrect'	*zaxrjasnut'*	'harden'
	visnut'	'hang, droop'		
[g]	*izbegnut'*	'avoid'	*volgnut'*	'become damp'
	promozgnut'	'become damp'	*drognut'*	'be chilled'
	brjuzgnut'	'swell'	*vvergnut'*	'cause to fall'
	vozdvignut'	'raise, erect'	*rastorgnut'*	'cancel'
	dostignut'	'reach'		
[k]	*molknut'*	'fall silent'	*privyknut'*	'get used to'
	moknut'	'become wet'	*mjaknut'*	'soften'
	merknut'	'grow dark, dim'	*nabrjaknut'*	'swell'
	gorknut'	'turn rancid'	*sjaknut'*	'to run dry'
	tusknut'	'grow dim, dull'		
[x]	*paxnut'*	'smell, reek'	*buxnut'*	'swell, expand'
	čaxnut'	'wither away'	*žuxnut'*	'dry up'
	tixnut'	'become quiet'	*puxnut'*	'swell'
	doxnut'	'die'	*tuxnut'*	'go out (heat/light)'
	gloxnut'	'become deaf'	*dryxnut'*	'sleep'
	soxnut'	'dry'	*drjaxnut'*	'grow decripit'
[i]	*stynut'*	'get cool'		
[a]	*vjanut'*	'fade, wither'		

out in September 2005 gave 41 occurrences of *obrydnut'* in the past tense, none of which were in the masculine singular.

Summarizing this section, we have seen that *nu*-drop verbs follow the *nesti* pattern insofar as the stem-final consonant (which is also root-final) is retained throughout the past tense subparadigm. It has furthermore been shown that in general the *nu*-drop verbs have the same morphological and phonological specifications of the stem as the *nesti* class; the stem is non-suffixed in the relevant past tense forms and tends to end in obstruents other than [t, d]. Since *nu*-drop verbs share all the relevant specifications with the nesti class, no modifications of the analysis are required in order to account for *nu*-drop verbs. In this way, *nu*-drop verbs lend additional support to the approach developed in section 7.1.

7.3. A rule-based approach

The problem we shall be concerned with in the following sections is how to represent the generalizations in (1) in Cognitive Grammar, and how to accommodate their interaction in this framework. I shall use non-suffixed verbs as examples, since this class shows a richer variety of patterns than the *nu*-drop verbs. However, before we consider Cognitive Grammar, it is instructive to explore a rule-based analysis. This is the topic of the present section.

In order to account for the past tense forms of the three types of non-suffixed verbs explored in section 7.1, we need a set of ordered rules that delete segments in the relevant forms. In the following I shall focus on the finite past tense forms since the complications regarding the *krast'* pattern in the non-finite forms are of no relevance for the argument. The necessary rules are listed in (2) in the order they apply. I have chosen a simple format, since the formalization does not bear on the present discussion. For convenience, I represent the alveolar plosives /t, d/ as a capital T and the lateral sonorants /l, lʲ/ as L.

(2) a. T → Ø /_ + L
("Delete /t, d/ before endings in /l, lʲ/.")
b. L → Ø / [obstr.] + _ #
("Delete word-final lateral after stems ending in obstruents.")
c. C → Ø /_ + C
("Delete stem-final C before C-initial endings.")

Rule (2a) accommodates the verbs of the *vesti* type. As we saw in the previous section, these verbs lose the stem-final /t, d/ in the finite past tense forms, where the ending begins with /l/ or /lʲ/. Verbs following the *nesti* pattern do not have truncation of the stem, so here we do not need a rule that deletes parts of the

stem. Instead, I assume rule (2b), which deletes the /l/ in the ending. The rule only applies in the masculine singular form where /l/ is in word-final position. The lateral is retained in the remaining finite past tense forms of *nesti*, as shown in Tables 7.1 and 7.3. Rule (2c) represents the global default pattern for Russian verbs, insofar as it prevents consonant clusters from occurring on the surface by deleting the stem-final consonant before a consonant-initial ending. This rule truncates the stem of verbs like *delat'* throughout the past tense subparadigm.

The interaction of these rules is illustrated in the derivations in (3), which concern the masculine singular forms of the three verbs *delat'*, *nesti* and *vesti*. For the convenience of the reader, deleted segments are marked with a double strikethrough (e.g. ~~j~~).

(3)	Underlying representation:	dʲélaj+l	nʲos+l	vʲod+l
	T → Ø /_ + L	—	—	vʲo~~d~~+l
	L → Ø / [obstr.] + _ ##	—	nʲos+~~l~~	—
	C → Ø /_ + C	dʲéla~~j~~+l	—	—
	Surface representation:	dʲéla+l	nʲos	vʲo + l

As can be seen from (3), the rule-based approach enables us to generate the correct past tense forms from the three groups of verbs. The ordering of the rules is crucial. If the order of application in (3) is changed, we get incorrect outputs. If, for instance, (2b) applies before (2a), the result is that /l/ is removed from /vʲod+l/ so that we create the incorrect output *[vʲod] instead of the correct [vʲol] from *vesti*. If (2c) applies before (2b), the incorrect output *[nʲol] instead of [nʲos] from *nesti*. Since (2a) must apply before (2b) and (2b) must apply before (2c), we get the rule ordering given in (3) above: (2a) before (2b) before (2c).

This ordering does not represent an idiosyncratic fact about the past tense forms of Russian verbs, because it follows from a universal principle – the Elsewhere Condition (Kiparsky 1982). Recall from section 2.4 that this principle is akin to the principle of conceptual overlap in Cognitive Grammar in that it is a formalization of the relationship between a default and an override. Kiparsky (1982: 136–137) states the Elsewhere Condition as follows:

(4) Rules A, B in the same component apply disjunctively to a form F if and only if
   a. The structural description of A (the special rule) properly includes the structural description of B (the general rule)
   b. The result of applying A to F is distinct from the result of applying B to F

   In that case, A is applied first, and if it takes effect, B is not applied.

Most of Kiparsky's technicalities are not relevant for present purposes. The important point is that the Elsewhere Condition determines the rule ordering, if subset relations (proper inclusion) hold between the structural descriptions of the rules in question. The rule with the most specific structural description takes precedence. The structural description is the material to the left of the arrow plus the material following the slash. Thus, in (2a) the structural description is the string T+L, i.e. alveolar plosive followed by a morphological boundary and a lateral sonorant. This string is a subset of the structural description in (2b), which involves an obstruent followed by a boundary and a lateral sonorant. The structural description of (2b), in turn is properly included in the structural description of (2c), viz. the string C+C. Given the Elsewhere Condition, therefore, the rules in (2) are automatically ordered as in (3). The particular ordering is therefore not something the language users have to memorize about their language. The question is now whether and how the past tense forms of the non-suffixed verbs can be accounted for in Cognitive Grammar – a question that is not trivial since this framework lacks both underlying representations and ordered, procedural rules. We shall consider the *nesti* class in 7.4, before we turn to the *vesti* class in 7.5-7.6 and the *krast'* class in 7.7.

7.4. The *nesti* pattern and rule ordering

Recall that generalization (1c) about the *nesti* pattern applies to non-suffixed verbs with stem-final obstruents. In section 4.4, it was shown that the difference between suffixed and non-suffixed verbs can be accommodated in Cognitive Grammar by means of the integration relation (Langacker 1987: 75). However, in Figure 7.1, I use the simplified notation developed in section 6.2, where the right edge of the root is represented as a square bracket labeled "R" for "root". In the leftmost schema in the figure, the square bracket is preceded by the feature [obst(ruent)]. Since there is no verbal suffix following the square bracket in the schema, it is clear that we are dealing with non-suffixed verbs in obstruents. The capital C after the + sign shows that the verbs in question have C-initial endings in the past tense, which for convenience is represented as PAST in the figure. The schema captures generalization (1c) that non-suffixed verbs in obstruents keep the stem-final consonant before a C-initial ending in the past tense subparadigm.

In Figure 7.1, the rightmost schema interacts with the schema that was introduced in chapter 5 in order to accommodate the default V+C pattern in the past tense, where a consonant-initial ending follows a vowel-final stem. The rightmost schema favors the candidate to the right, which lacks the stem-final [s]. However, the schema to the left overlaps with the leftmost candidate, where the

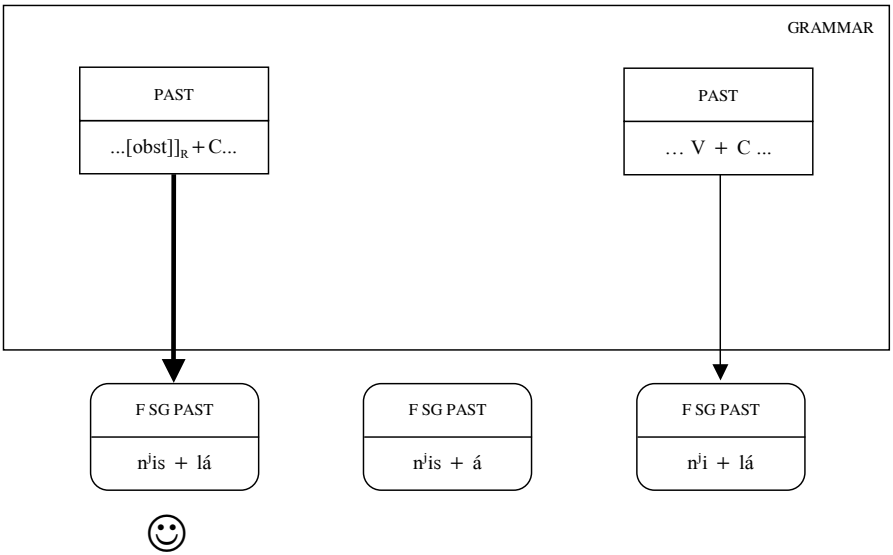

Figure 7.1. The feminine singular past tense of *nesti* 'carry'

root-final consonant is intact before the C-initial ending. Since the schema to the left refers to a subset of the verbs covered by the competing schema to the right, the leftmost candidate displays the higher degree of conceptual overlap with the grammar. It is therefore predicted to be the winner, a prediction that is borne out by the facts.

Before we leave the *nesti* pattern, it is necessary to consider the masculine finite past tense forms. As shown in Table 7.1, these forms keep the stem intact, but differ from the remaining past tense forms in lacking the inflectional ending [l]. Figure 7.2 includes three candidates, which parallel the candidates in Figure 7.1 with the single exception that they lack the feminine singular marker [a]. The grammar fragment contains the two schemas discussed above, as well as a schema in the middle designed to accommodate the masculine forms of the *nesti* class. This schema differs from its neighboring schema to the left in two crucial respects. First, the stem is not followed by an ending. Secondly, the semantic pole of the schema in the middle contains the additional features "masculine" and "singular" abbreviated as M SG. In short, the schema captures the generalization that a masculine singular past tense form consists of the bare stem, if this stem is non-suffixed and ends in an obstruent. The schema corresponds closely to rule (2b) in the preceding section, but there is one crucial difference. The rule refers to the ending. Because in the relevant form no ending is attested in the

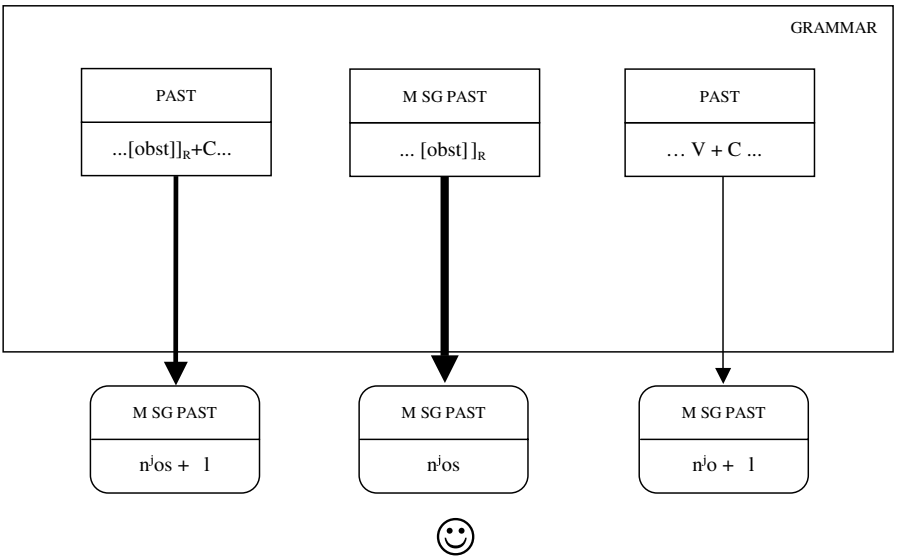

Figure 7.2. The masculine singular past tense of *nesti* 'carry'

nesti class, a schema over this class cannot include the ending. However, there is no motive to include an ending, since it does not occur in actual utterances, which is the only source for representations in Cognitive Grammar.

The rightmost candidate in Figure 7.2 is an instantiation of the default schema to the right in the grammar, because the candidate has a V-final stem followed by a C-initial ending. Like in Figure 7.1, the leftmost candidate instantiates the schema to the left in the grammar. Since this schema refers to a subset of the verbs covered by the rightmost schema, the leftmost candidate shows a higher degree of conceptual overlap with the grammar than the rightmost schema. However, the candidate in the middle displays yet a higher degree of conceptual overlap, since it is an instantiation of the most specific schema in the grammar. The candidate in the middle is therefore correctly predicted to be the winner.

Taken together, Figures 7.1 and 7.2 show that Cognitive Grammar offers a straightforward analysis of the *nesti* class. Ordered rules are not required in order to accommodate the past tense forms of these verbs; schemas, categorizing relationships and the principle of conceptual overlap suffice to account for the subset relations between the relevant classes of verb.

7.5. The *vesti* pattern and underlying representations

The *vesti* class raises additional problems as can be seen from Figure 7.3, which comprises the three schemas discussed in the previous section. Since all the finite past tense forms of the *vesti* class behave alike with regard to the truncation alternation, we shall only consider the masculine singular form. In the same way as in the previous section, we shall compare three candidates: one with both stem and ending intact (left), one lacking the ending, and one lacking the stem-final consonant. As can be seen from the figure, the three schemas from the previous section are not sufficient to select the correct candidate and I have therefore augmented the grammar fragment with a second-order schema. A schema for the *vesti* pattern must refer to the stem-final [t, d], because that segment distinguishes this pattern from the *nesti* pattern. However, the schema cannot refer to [t, d] in the finite past tense forms, because – as shown in Table 7.1 – [t, d] are not attested in these forms. In the rule-based approach we explored in section 7.3, it was possible to refer to /t, d/, because it makes sense to include these sounds in the underlying representation and then let the rule component delete them. However, Cognitive Grammar has neither procedural rules nor underlying representations. Recall from section 2.2 that the content requirement is only compatible with structures occurring in actual utterances, schemas over such structures and categorizing relationships connecting them. The challenge is therefore to capture the generalization about the *vesti* class without violating the content requirement.

The second-order schema in Figure 7.3 is designed to take care of this problem. Most forms of the paradigm posit an alveolar plosive in stem-final position. In the following, we shall take advantage of the fact that the present tense forms of *vesti* class verbs have stem-final [d, t] or the corresponding palatalized segments [t^j, d^j]. It is possible that speakers notice the similarities (and differences) between the present and past tense forms of the *vesti* class verbs and form schemas not only for the individual cells in the paradigm, but also over the systematic relationships holding between them. The second-order schema represents the generalization that there are non-suffixed verbs that have a stem ending in a palatalized alveolar obstruent (symbolized as T^j) in the present tense, but lack this consonant in the finite past tense forms. The schema refers to a palatalized consonant because, as I shall argue in section 10.1, softening represents the default pattern for non-suffixed verbs in the present tense.

In Figure 7.3, the second-order schema is the most specific schema in that it refers to the smallest class. The class of non-suffixed verbs with stem-final alveolar plosives is a subset of non-suffixed verbs with stem-final obstruents, which in turn is a subset of all verbs. Since the rightmost candidate overlaps

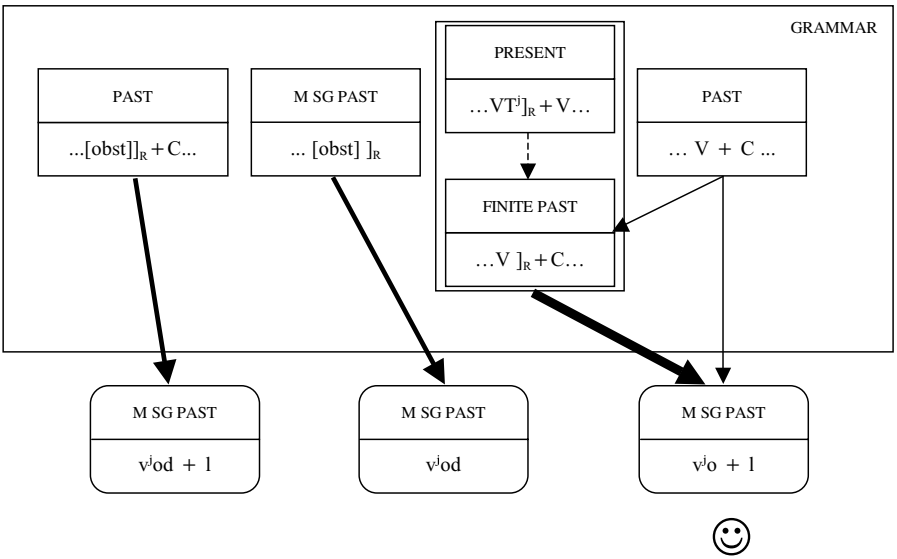

Figure 7.3. The masculine singular past tense of *vesti* 'lead'

with the second-order schema and in addition instantiates the default schema to the right, this candidate displays the highest degree of conceptual overlap with the grammar. It is correctly predicted to be the winner, as indicated by the smiling face.

Notice that an arrow connects the rightmost schema with the lower portion of the second-order schema. The latter is an instantiation of the former since it includes all the specifications of the former, but in addition refers to non-finite forms of non-suffixed verbs. It follows from this that whenever a candidate overlaps with the lower portion of the second-order schema, this candidate overlaps with the more general schema to the right as well. In this way, Cognitive Grammar enables us to capture the generalization that the *vesti* pattern is compatible with the default pattern in the finite past tense. In these forms, both patterns involve a vowel-final stem followed by a consonant-initial ending. In chapter 6, we saw that instantiation arrows between schemas in the grammar facilitate an account of phonology-morphology interaction. In section 7.7, I shall argue that the same theoretical machinery provides an account of ongoing linguistic change.

7.6. Theoretical implications: Restrictiveness

The analysis of the *vesti* pattern is of theoretical significance, because it offers a particularly clear illustration of the differences between rule-based approaches and Cognitive Grammar. In this section, we shall consider three implications, all of which in various ways testify to the restrictiveness of Cognitive Grammar.

First of all, the analysis has shown that underlying representations are not necessary in order to account for the *vesti* pattern. At this point, the reader may ask why that is a desirable result. S/he may correctly point out that a rule-based analysis along the lines discussed in section 7.3 *works*. In other words, what is wrong with underlying representations? The answer is as simple as the question. There is nothing wrong with underlying representations per se. However, I suggest that Occam's razor applies; Cognitive Grammar dispenses with theoretical machinery that lacks motivation outside linguistics. The key concepts in Cognitive Grammar are schemas and categorizing relationships, which are relevant beyond linguistics (cf. e.g. Langacker 1987: 99–146, Taylor 2002: 8–16 and Dąbrowska 2004: 203–229). There is nothing in the concepts of "schema" and "categorizing relationship" that limit their application to language (although I hope to have shown that they are very useful in linguistic analysis). "Underlying representation" in the sense discussed in section 7.3, on the other hand, is a purely linguistic notion designed to capture generalizations about language. In a nutshell, the argument goes like this. Since we need schemas and categorizing relationships outside linguistics, and these concepts can do the job of underlying representations in linguistic analysis too, we can dispense with underlying representations. From the perspective of Occam's razor, this is a desired result, since it involves a simplification of the theoretical machinery. This point also bears on restrictiveness. Cognitive Grammar is restrictive in the sense that it only admits the parsimonious set of theoretical constructs licensed in the content requirement: surface forms, schemas and categorizing relations.

I hasten to add that my argument does not exclude the possibility that there could be structures that are unique to language. Although most adherents of cognitive linguistics would expect the quantity of such structures to be relatively modest, at the end of the day, this is an empirical question. Cognitive linguistics and Cognitive Grammar can shed light on the issue. Pursuing the hypothesis that there are no structures unique to language, cognitive linguists try to reduce as much as possible in language to non-linguistic concepts. This endeavor may potentially lead to the discovery of structures unique to language, in which case the hypothesis is falsified. The opposite strategy seems less rewarding. If we start out by postulating that language is fundamentally different

from other areas of cognition, we will never be able to move beyond aprioristic assumptions.[75]

A second theoretical implication of the Cognitive Grammar analysis of the *vesti* pattern pertains to the so-called abstractness issue in phonology. With the publication of Chomsky and Halle's groundbreaking *The Sound Pattern of English* (1968) it became clear to many linguists how powerful a framework with rules and underlying representations is. An intense debate started as to whether and how one could constrain the model's abstractness, i.e. the "distance" between the underlying representations and the surface forms. As mentioned in section 3.4, the problem is that there are no limitations inherent in the framework as to how much an underlying representation can differ from the surface forms. Seeking broader and broader generalizations, many researchers postulated underlying representations that reflected diachronic changes that took place centuries or even millennia ago. In his analysis of present-day Russian, for instance, Lightner (1972: 58) assumed both long and short underlying vowels – a distinction that was lost more than a thousand years ago. While the abstractness problem was subject to lively discussions, it seems fair to say in retrospect that no generally accepted solution was ever achieved (Anderson 1985: 349–350). With the advent of autosegmental phonology in the second part of the 1970s, the main focus of most phonologists shifted from rules and derivations to representations, and the discussion of abstractness petered out.

Cognitive Grammar and cognitive linguistics in general adopt a radical position on the abstractness issue in that underlying representations are abandoned altogether. It follows from the content requirement (cf. section 2.2) that the only structures an analysis couched in Cognitive Grammar can refer to are surface forms, schemas and categorizing relationships connecting them. My analysis of the *vesti* pattern illustrates this. A schema for finite past tense forms like [v^{j}o+l] '(he) led' cannot refer to an alveolar plosive because the stem-final consonant is not attested in these forms. As we have seen, however, a rule-based model can assume an underlying /d/. In fact, there are in principle no constraints inherent in the model that would prevent an eccentric analyst from postulating, say, /ð/ or even /d/ in underlying representation. In contrast, Cognitive Grammar is very restrictive in that the content requirement precludes reference to structures not attested in actual utterances.

The third and final implication from the analysis of the *vesti* pattern also regards restrictiveness. We have seen that a second-order schema modeling relations to other forms in the paradigm is important in the analysis. The question arises as to whether there are any restrictions on relations of this type. As pointed

75 For discussions of this argument, see e.g. Lakoff (1977: 237–238), Hudson (1990: 9) and Dąbrowska (2004: 215).

out in section 4.2, the cognitive linguistics conception of inflectional paradigms as structured networks constrains such relations in at least three ways. To begin with, we expect relations to hold between semantically closely related forms. The second-order schema employed in the analysis of the *vesti* pattern complies with this insofar as it connects forms that only differ in the specifications for tense (present vs. past). A second-order schema connecting, say, the imperative plural with the masculine singular finite past tense would be much less likely. Furthermore, we expect less semantically marked forms to serve as bases for more marked forms. Without going into a discussion about the nature of semantic markedness, a relation from the present tense seems much more likely than relations taking relatively marked forms like the imperative plural or the present passive participle as their starting point. Last but not least, we expect relations to go from more to less frequent forms. Since the second-order schema for the *vesti* pattern connects groups of forms, rather than single forms, this expectation cannot be tested in a straightforward way. However, the general point remains; we would not expect relations taking low frequency forms like the present tense gerund or the present passive participle as their points of departure. Although the constraints on relations do not rule out certain types of relations categorically, they show that some relations are much more likely to occur than others. In this way, Cognitive Grammar involves restrictions on the relations that can be represented as second-order schemas.

In conclusion, let me briefly summarize the theoretical implications from the analysis of the *vesti* pattern. First, we have seen that Cognitive Grammar renders underlying representations superfluous. This, I have argued, is a desirable result on the basis of Occam's razor, and it also illustrates that Cognitive Grammar is restrictive in that only a parsimonious set of theoretical structures are permitted. Second, Cognitive Grammar is also restrictive insofar as it precludes reference to structures not occurring in actual utterances. Third, the *vesti* pattern illustrates that second-order schemas relating forms in the paradigm replace reference to underlying representations in Cognitive Grammar. The conception of paradigms as structured networks place constraints on such relations, thus testifying to the restrictiveness of Cognitive Grammar.

7.7. The *krast'* pattern and ongoing language change

In this section we shall consider the *krast'* pattern, which as shown in Table 7.1 differs from the *vesti* pattern in the non-finite past tense forms. I shall limit my discussion of the non-finite forms to the past active participle. The special behavior of the past passive participle was explored in section 5.5; the gerund

in the past tense subparadigm enjoys a somewhat marginal status, and will not be discussed in the following.[76]

Because the *krast'* pattern only comprises a handful of verbs in Contemporary Standard Russian, it might be tempting to write them off as idiosyncratic exceptions of little or no relevance for the structure of present-day Russian. However, at least three arguments suggest that the *krast'* class deserves closer attention. First, as we shall see below, the verbs in question share a set of features, which make it possible to formulate generalizations. Second, even though the class is irregular in that it deviates from the patterns of *nesti* and *vesti*, it is *regular* in the sense that it conforms to the default pattern of *delat'*. As can be seen from Table 7.1, *krast'* lacks the stem-final consonant throughout the past tense subparadigm in the same way as *delat'*. Third, as documented by Flier (1981), the *krast'* pattern represents the leading edge of a historical change that has been going on for centuries and is still operative in the language. Since, as argued by Flier, this change is part of a systematic restructuring of the Russian verb stem, it seems clear that the *krast'* class is of relevance for the present study.

Since we are dealing with ongoing change, several verbs have alternative forms. It is therefore difficult to establish exactly which verbs follow the *krast'* pattern. In Table 7.5, which contains all non-suffixed verbs in alveolar plosives, I consider the first five verbs members of the *krast'* class.[77] According to Flier (1981: 97), these verbs were the first to show the innovative forms (e.g. [krá+fʂij] instead of the older [krát+ʂij]). The change has come to its completion in these verbs in that only the innovative forms are acceptable in the standard language today (Švedova (ed.) 1980: 659).[78] This is confirmed by data from the Russian National Corpus, insofar as these verbs only displayed innovative forms conforming to the *krast'* pattern. (The only exception was *klast'*, for which the relevant forms were not attested in the corpus at all.) This is certainly a minimal list since some of the other verbs in Table 7.5 show vacillation in present-day

76 While in most cases the gerund involves reference to events in the past, this is not always the case. As pointed out in section 4.2, it is more accurately described as a *perfective* than a *past tense* gerund since it is always formed from perfective verbs. The gerund also shows special behavior with regard to form. Some of the non-suffixed verbs (including *vesti* and *nesti*) form perfective gerunds with the ending [a], which is otherwise reserved for imperfective gerunds. In Table 7.1, however, I have only listed the more archaic gerunds in [fʂi].

77 Table 7.5 includes all the verbs in alveolar plosives listed in Table 7.2 with the exception of *(ras)svesti* 'dawn'. This impersonal verb is omitted since its paradigm is defective and does not contain any non-finite forms.

78 The archaic form *padšij* has been lexicalized in the meaning 'fallen' in the moral sense as in phrases like *padšaja ženščina* 'fallen woman'. However, the regular past active participle of *past'* is *pavšij* (without the alveolar plosive in stem-final position).

Table 7.5. Non-suffixed verbs in alveolar plosives

Verb	Pattern	Prevocalic C	Stem V[79]	Stem-final C	Stress
past' 'fall'	*krast'*	hard	[a]	[d]	stem
klast' 'lay'	*krast'*	hard	[a]	[d]	stem
krast' 'steal'	*krast'*	hard	[a]	[d]	stem
sest' 'sit down'	*krast'*	soft	[e]	[d]	stem
est' 'eat'	*krast'*	soft	[e]	[d]	stem
vesti 'lead'	*vesti*	soft	[o]∼[e]	[d]	end
bresti 'plod'	*vesti*	soft	[o]∼[e]	[d]	end
idti 'walk'[80]	*vesti*	soft	[o]∼[e]∼Ø	[d]	end
mesti 'sweep'	*vesti*	soft	[o]	[t]	end
gnesti 'oppress'	*vesti*	soft	[o]	[t]	end
plesti 'braid'	*vesti*	soft	[o]	[t]	end
prjast' 'spin'	*vesti*	soft	[a]	[d]	stem/end
bljusti 'watch over'	*vesti*	soft	[u]	[d]	end
cvesti 'flower'	*vesti*	soft	[o]∼[e]	[t]	end
obresti 'find'	*vesti*	soft	[o]∼[e]	[t]	end
(s)čest' 'count'	*vesti*	soft	[o]∼Ø	[t]	stem

Russian, a fact that is acknowledged even by the fairly conservative Russian academy grammar (Švedova (ed.) 1980: 659). However, the five verbs can be considered a prototype where the innovative forms are most entrenched. They represent a bridgehead which may serve as the basis for further extension of the *krast'* pattern.

The question is now whether it is possible to state a schema for the *krast'* pattern. In Table 7.5 the verbs are classified with regard to four parameters.

79 This column gives the vowels as they occur in stressed position. The notation "[o]∼[e]" is employed for verbs which have [o] in the stem of the masculine sg past tense, but [e] in the past active participle, e.g. [vʲól] and [vʲétʂij] of *vesti*. This information is taken from Zaliznjak (1977). Notice that the [o]∼[e] alternation is not predictable from vowel reduction. Verbs with a so-called mobile vowel where no vowel is present in the finite past tense forms with a vocalic ending, are marked with an additional "∼Ø" in the table.

80 This verb displays suppletion as witnessed by forms like [ʂol] (masculine singular past tense). In Table 7.6, /ʂ/ is classified as soft, because for morphological purposes it functions like a palatal(ized) sound, although it is not phonetically palatal or palatalized. We shall return to the status of [ʂ] in chapter 9.

The first three concern the segmental structure of the root, viz. whether the consonant before the stem vowel is hard or soft, which vowel the stem contains, and whether the stem-final consonant is [t] or [d]. In addition, the table contains information about the stress pattern in the past tense subparadigm. Some verbs have stress on the stem in all forms, whereas others have stressed endings in the finite forms with a vowel in the ending. In Table 7.5 I refer to these patterns as "stem stress" and "end stress", respectively.[81]

The first three verbs in Table 7.5, *past'*, *klast* and *krast'*, have a non-palatalized consonant followed by [a] and [d]. They all display stem stress in the past tense. These generalizations are captured in the leftmost schema in the lower portion of Figure 7.4. The two remaining verbs in the *krast'* class, *sest'* and *est'*, also have a stem-final [d] and stem stress, but differ from *past'*, *klast'* and *krast'* in showing a palatalized consonant followed by [e] in the beginning of the stem. This is captured in the rightmost schema in the figure. Since the two schemas in the lower portion of the figure overlap, it is possible to state a more general schema covering all the verbs in the *krast'* class. Notice that this schema specifies the stem vowel as [unrounded]. This sets the *krast'* pattern apart from the *vesti* pattern, where all but one verb has rounded vowels. Characteristic for the *vesti* pattern is the stem vowel [o], which may or may not alternate with [e] or Ø. The other rounded vowel, [u], is only attested in one verb, *bljusti*.

It may seem questionable to state schemas for small classes like the *krast'* class. However, in addition to accounting for an attested pattern in the language, the topmost schema in Figure 7.4 has an empirical prediction that is worth mentioning. As can be seen from Table 7.5, the only verb outside the *krast'* class with an unrounded vowel is *prjast'*. This verb is not fully compatible with the schemas in the lower portion of Figure 7.4, although the only feature that distinguishes it from *past'*, *klast'* and *krast'* is the fact that *prjast'* has a palatalized consonant before the stem vowel. Notice, however, that the stem of *prjast'* is fully compatible with the topmost schema in Figure 7.4; since this schema generalizes over both palatalized consonants (in *est'* and *sest'*) and non-palatalized consonants (in *past'*, *klast'* and *krast'*), it does not specify whether the consonant is palatalized or not. For convenience, I represent this as C^x. Since *prjast'* is compatible with the topmost schema in Figure 7.4, we would expect it to pattern with the *krast'* class, or at least show some vacillation. This prediction seems to gain some support in the available data. Flier (1981: 97),

81 Since the stems of the verbs *idti* and *(s)čest'* do not contain a vowel in finite past tense forms with a vowel in the ending, it is difficult to determine the stress pattern for these verbs. I follow Flier (1981) and assign the stress pattern for these verbs on the basis of the ending in the related infinitive, which is stressed in the case of *idti*, but not for *(s)čest'*.

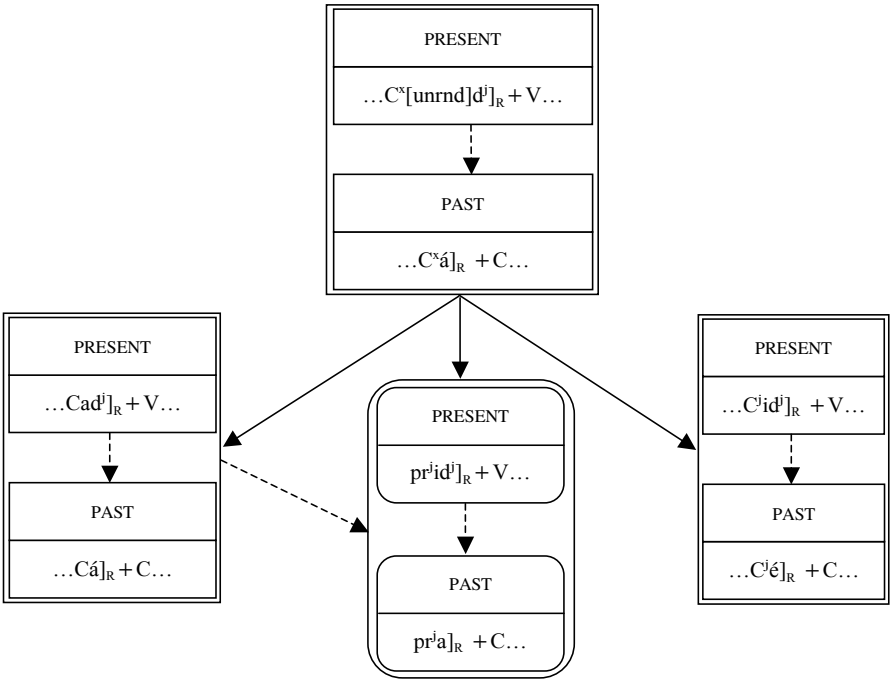

Figure 7.4. Schemas for the *krast'* class with predictions for *prjast'* 'spin'

who investigated a large sample of dictionaries, observed that there is "lack of agreement as to the contemporary norms for this verb". Unfortunately, this verb is so infrequent that the relevant forms do not occur in the Russian National Corpus, but an internet search with google.ru gave seventeen occurrences of forms complying with the *krast'* pattern, and no forms of the *vesti* type, thus providing some support for the topmost schema in Figure 7.4.[82] Notice that *prjast'* is given in rectangles with rounded corners in the figure. As mentioned in section 2.3, rounded corners are used for elements that have not acquired status as conventionalized units in the grammar (e.g. candidates). This seems

82 The searches were performed on September 26 and October 6, 2005. Google was chosen as the search engine, because it does not lemmatize. In other words, it is simple to delimit the search to one grammatical form. I searched for masculine singular nominative past active participles of the forms *prjavšij* and *prjadšij* with all the prefixes given in Zaliznjak (1977). Since spinning is traditionally associated with women, I also searched for the corresponding feminine forms in all cases in the singular.

justified for *prjast'*, where, as we have seen, norms are unclear in present-day Russian.

In Figure 7.5, I show how the schema for the *krast'* class interacts with other schemas relevant for non-finite past tense. The rightmost schema represents the smallest class of verbs, insofar as the *krast'* class is a subset of verbs with stem-final [t, d], which in turn is a subset of the class of verbs in obstruents. The latter class is a subset of all verbs. Since the schema for the *krast'* class shows the highest degree of specificity, the candidate *kravšij* is correctly selected as the winner.

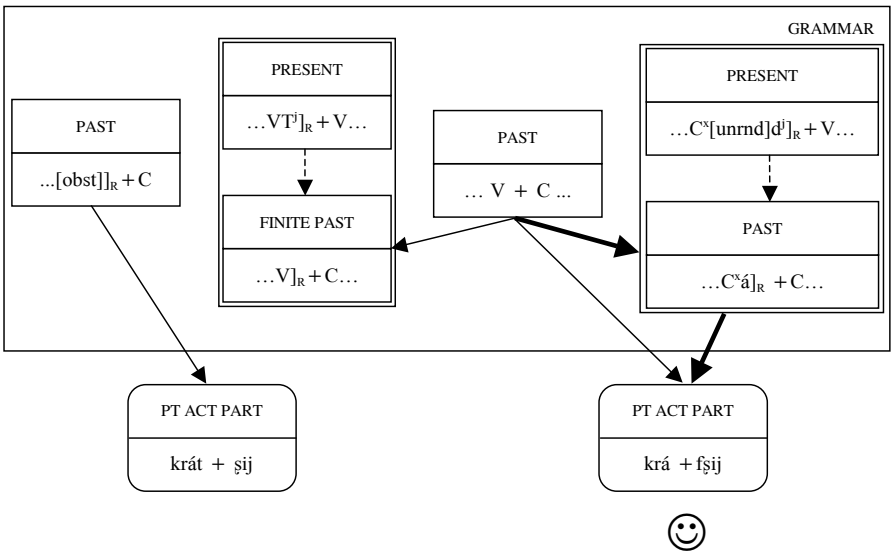

Figure 7.5. The past active participle of *krast'* 'steal'

As mentioned, the emergence of the *krast'* class is an innovation that is part of an ongoing change in Russian. Flier (1981: 95–99) argues that the change has systemic motivation, and points out that verbs with stem stress and stable stem vocalism (e.g. *krast'*) have been more prone to innovation than stems with alternating stem vowels and/or end stress (e.g. *vesti*). Flier's analysis is well supported by diachronic data, so it is significant that it can be formally expressed in Cognitive Grammar. Stem stress and stable vocalism in the past tense are both properties of the default pattern for Russian verbs; other stress patterns and vowel alternations of the type attested in *vesti* are found in only a small minority of Russian verbs. I shall not modify the default schema here so as to encompass Flier's two factors, because that is not essential for the argument. However, the relationship between the default and *krast'* patterns is expressed

formally in Figure 7.5, insofar as an instantiation arrow leads from the schema of the former to the schema of the latter. This is another way of saying that the *krast'* pattern is a special case that is fully compatible with the default pattern. In other words, the *krast'* pattern gains support from the default pattern, which may provide motivation for its expansion to more verbs over time. As mentioned in section 7.5, there is also an instantiation relation connecting the default pattern and the schema for the *vesti* class. However, the *krast'* schema shows a higher degree of overlap with the default pattern, insofar as the *krast'* pattern complies with the default pattern throughout the past tense subparadigm, while the *vesti* class only conforms to the default pattern in the finite forms. In this way, the *krast'* pattern receives stronger support from the default pattern, as symbolized by the thicker arrow. In chapter 6, we saw that instantiation relations connecting the schemas in the grammar enable us to account for the interaction of phonology and morphology whereby morphological schemas gain support from phonological schemas. We have now seen that instantiation relations clarify the motivation for diachronic change. In other words, the two phenomena are special cases of the same general cognitive phenomenon. This illustrates the explanatory power of Cognitive Grammar. By means of a small set of theoretical constructs the model manages to unify phenomena that would otherwise seem unrelated.

7.8. Conclusion

Based on a detailed investigation of Russian past tense forms, this chapter has shown that Cognitive Grammar posits viable alternatives to abstract underlying representations and ordered rules. I have argued that an approach in terms of schemas and categorizing relationships is both restrictive and explanatory. The cognitive approach is *restrictive* in that it (a) employs a parsimonious set of cognitively motivated concepts, (b) precludes reference to structures not present in surface representations, and (c) is constrained by the cognitive linguistics view of inflectional paradigms as structured networks. The cognitive approach is also *explanatory*; analyzing language change and phonology-morphology interaction by means of instantiation relations between schemas in the grammar, Cognitive Grammar predicts that these seemingly diverse phenomena fall out as special cases of the same general cognitive phenomenon.

In this chapter we have seen that non-suffixed verbs and *nu*-drop verbs form systematic exceptions to the default V+C pattern for the past tense described in chapter 5. The exceptional verbs constitute three well-defined classes of verbs, which can be characterized in terms of the sound shape and morphological structure of the stem. The three classes constitute a nested structure, where

subset relations hold between all classes and highly specific schemas override local defaults, which in turn take precedence over the global default discussed in chapter 5. After the analysis of the infinitive in chapter 6 and the past tense in this chapter, we turn to the imperative in chapter 8, which concludes the analysis of the truncation alternation and addresses the theoretical problems of phonological opacity and product-oriented generalizations.

Chapter 8
Opacity and product-oriented generalizations: Exceptional imperative

Focusing on exceptional imperatives, this chapter addresses two important theoretical problems. First, it provides an illustration of Cognitive Grammar's ability to accommodate product-oriented generalizations as first-order schemas. Second, the exceptional imperatives involve opacity. I shall explore a morphological approach to opacity, according to which phonological opacity boils down to a characterization of morphological forms and the relations between them in the inflectional paradigm. It will be argued that the morphological approach has strong implications for future research.

This chapter is the last of three chapters exploring systematic exceptions to the default pattern for the truncation alternation established in chapter 5. While many imperatives comply with the default C+V schema, we shall consider verbs that lack a V-initial imperative suffix. I argue that the exceptional imperatives are predictable on the basis of the shape of the verb stem and relations between forms in the paradigm, and can be accommodated by specific schemas that override the default pattern analyzed in chapter 5. It is shown that both regular and exceptional imperatives are covered by a product-oriented generalization, according to which the imperative singular ends in a segment with a palatal place of articulation.

8.1. Imperatives and opacity

In chapter 5, we saw that the C+V schema is characteristic of the forms in the present tense and imperative subparadigms. In other words, we expect imperatives with V-initial endings that select a C-final stem. This prediction is correct for many imperatives, but far from all imperatives follow the default pattern. The five verbs in Table 8.1 will serve as examples throughout this chapter. For convenience, in addition to the imperative singular and plural I give one form from each of the three remaining subparadigms. The first three verbs have the ending [i] in the imperative singular. Since this vocalic ending follows after a C-final stem, these verbs display the C+V pattern we expect. The last two verbs, *igrat'* 'play' and *brosit'* 'throw', on the other hand are different; they lack an ending in

the imperative singular.[83] The analysis developed in chapter 5 accounts for the shape of the stem before V- or C-initial endings, but has nothing to say about verb forms with no ending at all. Imperative singular forms like [igráj] and [bros^{j}] are therefore problematic. The imperative plural forms of these verbs, [igráj+t^{j}i] and [brós^{j}+t^{j}i], are even more obviously problematic. These forms have the C-initial ending [t^{j}i], so we would expect a V-final stem.[84] But this prediction is not borne out; forms of this type have C-final stems creating an unexpected C+C cluster that is otherwise not attested in the Russian verb paradigm. In the following, I will say that verbs like *igrat'* and *brosit'* have "exceptional imperatives". Notice that imperatives of this sort are numerous; they are attested in several productive verb classes, e.g. with the productive suffixes [aj], [ej] and [ava]. Referring to such imperatives as "exceptional" is therefore potentially misleading. However, the imperatives in question are exceptional in two senses: they lack the default ending [i] in the imperative, and they are problematic for the analysis of the truncation alternation developed in chapter 5.

Table 8.1. Regular and exceptional imperatives

Imp sg:	Imp pl:	3 pl present:	M sg past:	Infinitive:	Gloss:
maxn^{j}+í	maxn^{j}+í+t^{j}i	maxn+út	maxnú+l	maxnú+t^{j}	'wave'
kr^{j}íkn^{j}+i	kr^{j}íkn^{j}+i+t^{j}i	kr^{j}íkn+ut	kr^{j}íknu+l	kr^{j}íknu+t^{j}	'cry'
gavar^{j}+í	gavar^{j}+í+t^{j}i	gavar^{j}+át	gavar^{j}í+l	gavar^{j}í+t^{j}	'speak'
bros^{j}	brós^{j}+t^{j}i	brós^{j}+at	brós^{j}i+l	brós^{j}i+t^{j}	'throw'
igráj	igráj+t^{j}i	igráj+ut	igrá+l	igrá+t^{j}	'play'

83 I shall say that the imperatives in question lack an inflectional ending rather than invoking a zero morpheme. Although the status of zero morphemes is an important theoretical question in morphology, it does not have a bearing on the topic of this chapter.

84 Notice that I use the term "ending" about [t^{j}i]. Some researchers, notably Roman Jakobson (1932, 1957), have maintained that [t^{j}i] is not an ordinary suffix/ending, but rather what in modern linguistics would be called a "clitic". However, on the basis of criteria for clitic status proposed by Zwicky and Pullum (1983), in Nesset (1998a: 251 and 264–272) I conclude that [t^{j}i] cannot be considered a clitic in present-day Russian. Consonant clusters also occur in imperative forms containing the reflexive/passive marker [s^{j}a], e.g. [j+s^{j}] in the military expression *strojsja* 'fall in!'. Although this marker was probably a clitic in Old Russian (East Slavic), it is best analyzed as a suffix/ending in Contemporary Standard Russian (cf. Nesset 1998a: 264–272, Nesset 1998b and Nesset 1998c for detailed discussion). I shall not explore [s^{j}a] in this book, as the [t^{j}i] ending is sufficient to illustrate consonant clusters in the imperative.

The distribution of the imperative allomorphs depends on two conditions, viz. the number of consonants in stem-final position and stress. These two conditions yield four logical combinations represented in Table 8.2. As shown in the table, the [i] ending is the default; the imperative selects this ending unless the stem ends in a single consonant and the imperative is stem-stressed.[85]

Table 8.2. The distribution of [i] vs. no ending in the imperative

	Stem ending in CC:		Stem ending in VC:	
End stress:	[i]	maxn^{j} + í 'wave'	[i]	gavar^{j} + í 'speak'
Stem stress:	[i]	kr^{j}íkn^{j} + i 'shout'	No ending	bros^{j} 'throw'
				igráj 'play'

In order to arrive at a more precise understanding of the exceptional imperatives, we may relate them to the notion of phonological opacity and consider a rule-based analysis. It makes sense to let the default ending be present in the underlying representation. We therefore need a rule that deletes the underlying /i/ ending in imperatives where the stem is stressed and ends in a single consonant. Rule (1) is designed for this purpose. Notice that the rule format is chosen for convenience; since nothing in the argument depends on the formalization, I will not discuss the format in the following.

(1) Imperative deletion:
i → Ø / σ' . . . C^{1}_ ("Delete /i/ after stressed stem that ends in a single consonant.")

The imperative deletion rule interacts with the Jakobsonian truncation rules discussed in section 5.2:

(2) Truncation:
a. V → Ø / _ + V ("Delete stem-final V before V-initial ending")
c. C → Ø / _ + C ("Delete stem-final C before C-initial ending")

These rules delete the first member of a V+V or C+C sequence. In other words, if the underlying stem ends in a vowel and occurs before a V-initial ending, the stem-final vowel is deleted so that the surface structure complies with the

85 The picture given in Table 8.1 is simplified somewhat. According to the Russian Academy Grammar (Švedova (ed.) 1980: 620–621), two fairly small groups of verbs show vacillation between [i] and no suffix: (a) stem-stressed verbs with [s^{j}t^{j}] or [rC] in stem final position (*očíst'* ~ *očísti* 'clean' and *ispórt'* ~ *ispórti* 'spoil') and (b) verbs with stressed prefix formed from simplex verbs with no suffix (*výbros'* ~ *výbrosi* 'throw out').

expected C+V pattern. If the underlying stem ends in a consonant and is followed by a C-initial ending, the stem-final consonant is deleted so as to create the expected V+C sequence.

Recall from section 3.6 that opacity occurs under two types of rule interaction. Counter-bleeding yields opaque overapplication, while opaque underapplication results from counter-feeding. The exceptional imperatives illustrate both over- and underapplication, as shown in the following derivations, where double strikethrough (e.g. ~~i~~) represents deletion.

(3)

Underlying representation:	brós^{j}i + i	igráj + i + t^{j}e
Truncation:	brós^{j}~~i~~ + i	—
Imperative deletion:	brós^{j} + ~~i~~	igráj + ~~i~~ + t^{j}e
Surface representation:	bros^{j}	igrájt^{j}i

The ordering of the rules is crucial. If imperative deletion applies before truncation we generate the incorrect surface forms *[brós^{j}i] and *[igrát^{j}i]. The correct form [bros^{j}] emerges under counter-bleeding. Imperative deletion *bleeds* truncation in the sense that it potentially destroys the conditioning environment for truncation; if the imperative ending were removed, there would be no hiatus and the application of truncation would be blocked. Imperative deletion *counter*-bleeds truncation insofar as it is ordered after truncation and therefore is prevented from destroying the conditioning environment of truncation. It is this counter-bleeding interaction that creates the impression that truncation overapplies. The surface form [bros^{j}] lacks the underlying stem-final /i/, so it is clear that truncation has applied although there is no V-initial ending in the surface form that would motivate truncation. As shown in (3), opaque overapplication receives a straightforward account in a rule-based analysis. First, truncation applies in its normal environment before the environment is removed by the later imperative deletion rule.

Opaque overapplication occurs whenever a rule applies although its conditioning environment does not occur on the surface. *Under*application, on the other hand, is when a rule does *not* apply, even though its conditioning environment is present on the surface. Imperative plural forms like [igrájt^{j}i] are examples of opaque underapplication. Unexpectedly, truncation has not applied, since the stem-final [j] is preserved despite the following C-initial ending [t^{j}i]. As shown in (3), however, the correct form is generated if truncation is ordered before the imperative deletion rule. There is no C-initial ending in the underlying representation, and truncation therefore does not apply. The unexpected [j+t^{j}] consonant cluster emerges as the consequence of the subsequent application of the imperative deletion rule. This is an example of counter-feeding. Imperative deletion feeds truncation; by removing the underlying imperative ending /i/ it

creates a consonant cluster that would trigger the application of the truncation rule. However, it *counter*-feeds truncation in that it is ordered last, and therefore prevents truncation from taking place.

The derivations in (3) demonstrate how one can account for opacity in a model with underlying representations and ordered, procedural rules. However, how can we accommodate the exceptional imperatives in Cognitive Grammar? As pointed out in section 3.6, the question is not trivial. The underlying and intermediate structures in (3) do not occur on the surface, so language users cannot form schemas over these structures. The strategy I shall explore in the following is to appeal to morphology instead. In section 8.2, we shall consider an overriding schema for the imperative singular, and in 8.3 a second-order schema for the relation between imperative singular and plural will be advanced.

8.2. Opaque overapplication in Cognitive Grammar

In order to provide a Cognitive Grammar account of the opaque overapplication in the imperative singular, we must first establish a structured network for the imperative category. Since there are two types of imperatives – one with the [i] ending and one without – I include two schemas in the middle portion of Figure 8.1. The schema to the right generalizes over imperatives with no ending like [igráj] 'play' and [bros^{j}] 'throw'. As we saw in the previous section, these imperatives have stem stress and one consonant in stem-final position. In the schema, the VC sequence captures the fact that the relevant imperatives end in a single consonant. Stem stress is represented by means of the acute accent preceding the capital V. Notice that the final consonant is "soft"; it is either palatal (cf. [j] in [igráj]) or palatalized (cf. [s^{j}] in [bros^{j}]). In other words, the final consonant has a palatal primary or secondary place of articulation. In the schema, I represent this by means of the subscript [pal] after the final consonant. For a more precise schema for "soft" consonants, see section 3.3.

The schema to the left in the middle portion of Figure 8.1 represents the default option (the ending [i]) and generalizes over the three imperative forms [maxn^{j}+í] 'wave', [kr^{j}íkn^{j}+i] 'cry' and [gavar^{j}+í] 'speak'. In these forms, both stem stress and end stress occur, and both one and two consonants are possible in stem-final position. I therefore do not include any information about the shape of the stem in the schema.

Notice that I propose a schema for all the imperatives in the figure, invoking the feature [pal(atal)]. In section 8.4, we shall return to the topmost schema in Figure 8.1, because it is relevant for the discussion of product-oriented generalizations in Cognitive Grammar. For now the focus will be on the schema for the

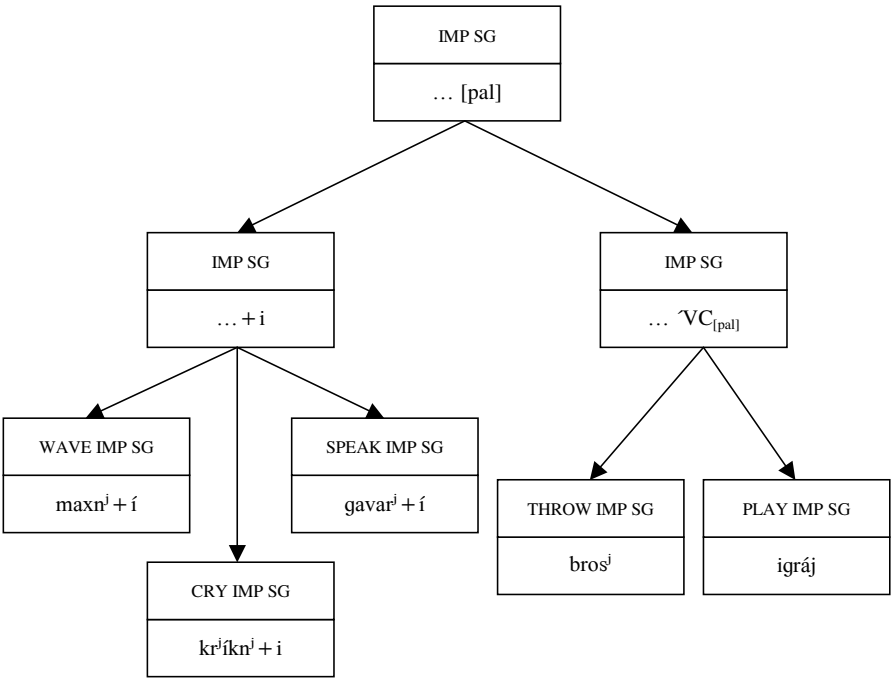

Figure 8.1. A structured network for the imperative singular

imperatives without an ending, i.e. those which involve opacity. What happens if we add this schema to the grammar fragment developed in chapter 5 for the default C+V and V+C patterns? Consider Figure 8.2, which models the choice of V- or C-final stem in imperatives. The rightmost candidate does not instantiate any of the schemas in the grammar fragment, because this candidate shows the unattested combination of a V-final stem and no ending. The leftmost candidate has a C-final stem followed by a V-initial ending, so this candidate is an instantiation of the leftmost schema in the grammar. The candidate in the middle instantiates the schema in the middle. Since this schema involves the most specific information, the candidate in the middle is selected as the winner.[86]

86 In Figure 8.2, the schema for the exceptional imperatives competes with the global default schema for the present tense and imperative subparadigms developed in chapter 5. It is possible that speakers instead of the global default consider as a competitor the more specific schema for imperatives with the ending [i] from Figure 8.1. Either way, the schema for the exceptional imperatives is predicted to be the winner, since it involves the most specific information. It applies to the imperative singular,

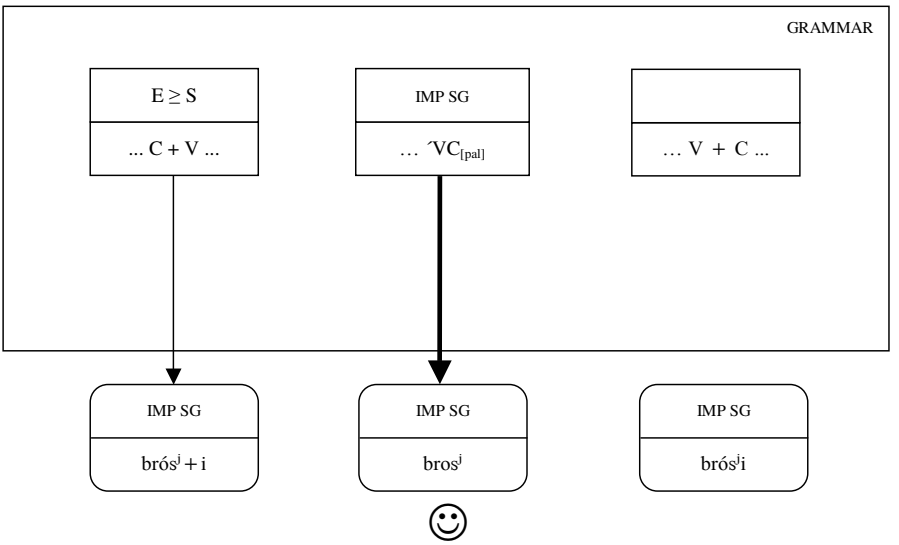

Figure 8.2. Schema interaction for opaque overapplication in the imperative sg

Figure 8.2 shows that Cognitive Grammar facilitates an account of opaque overapplication in the imperative singular. I refer to the approach as "morphological", because it involves an overriding schema that characterizes the shape of a morphological form and includes the morphological properties "imperative" and "singular". In the following section, I shall take the morphological approach one step further and propose a second-order schema representing the systematic relationship between imperative singular and plural forms.

8.3. Opaque underapplication in Cognitive Grammar

Recall that opaque underapplication is attested in imperative plural forms like [igráj+t^{j}i], which retain the stem-final consonant [j] in spite of the C-initial ending. How can we account for the unexpected consonant clusters in Cognitive Grammar? The descriptive generalization for the imperative plural is simple; the plural form equals the singular form with the addition of [t^{j}i]: [87]

and in addition includes information about the stress pattern and the shape of the stem.

87 There is one systematic exception to this generalization that will not be discussed in the following since it is tangential to the problem under scrutiny. As mentioned in a

(4)

	Imperative plural	= imperative sg	+ [tʲi]
a.	[maxnʲ+í+tʲi]	= [maxnʲí]	+ [tʲi]
b.	[krʲíknʲ+i+tʲi]	= [krʲíknʲi]	+ [tʲi]
c.	[gavarʲ+í+tʲi]	= [gavarʲí]	+ [tʲi]
d.	[brósʲ+tʲi]	= [brosʲ]	+ [tʲi]
e.	[igráj+tʲi]	= [igráj]	+ [tʲi]

The first question we must address is how we can accommodate the descriptive generalization in Cognitive Grammar. Consider the structured category network in Figure 8.3, which concerns the imperative singular and plural forms of *govorit'* 'speak' and *igrat'* 'play'. For each of the four verb forms, we may advance schemas specifying the attested shape of the stem and suffixes, as well as the relevant meanings they express. Speakers may compare the singular and the plural forms and relate them in terms of extension relationships marked as dashed arrows. Recall that extensions are categorization relationships indicating that two elements are partially compatible. They are similar, but neither is a subcategory of the other. It is furthermore possible that speakers perform comparisons of this sort systematically, and form schemas over these extension relationships between the imperative singular and plural. I suggest representing this by means of dashed arrows connecting the schemas for each pair and rectangles enclosing the connected schemas. The two second-order schemas in the lower portion of the figure both instantiate a less specific schema, but since this schema will not play an important role in my argument I shall not discuss it in the following. What is important in the present context is the fact that Cognitive Grammar enables us to accommodate the relationship between the imperative singular and plural. It is possible to account for the descriptive generalization in (4) by means of a second-order schema.

Let us now see what happens if we add the second-order schema for the exceptional imperatives to the grammar fragment discussed earlier in this chapter. Figure 8.4 considers two candidates for the imperative plural of *igrat'*, one with a C-final stem (left) and one with a V-final stem (right). The leftmost candidate

---

footnote in section 8.1, two relatively small groups of verbs are reported to vacillate between [i] and no ending in the imperative singular. According to the Russian Academy Grammar (Švedova (ed.) 1980: 622), however, the vacillation does not carry over to the plural insofar as only one of the attested singular forms allows the addition of [tʲi]. Stem-stressed verbs with [sʲtʲ] or [rC] in stem final position form the imperative plural on the basis of the suffixed singular form. Thus, while both *očíst'* and *očísti* 'clean' are attested in the singular, the plural is only formed from the latter: *očístite*. For verbs with stressed prefix that show vacillation in the imperative singular (e.g. *výbros'* ~ *výbrosi* 'throw out') the plural is only formed from the non-suffixed singular forms (*výbros'te*).

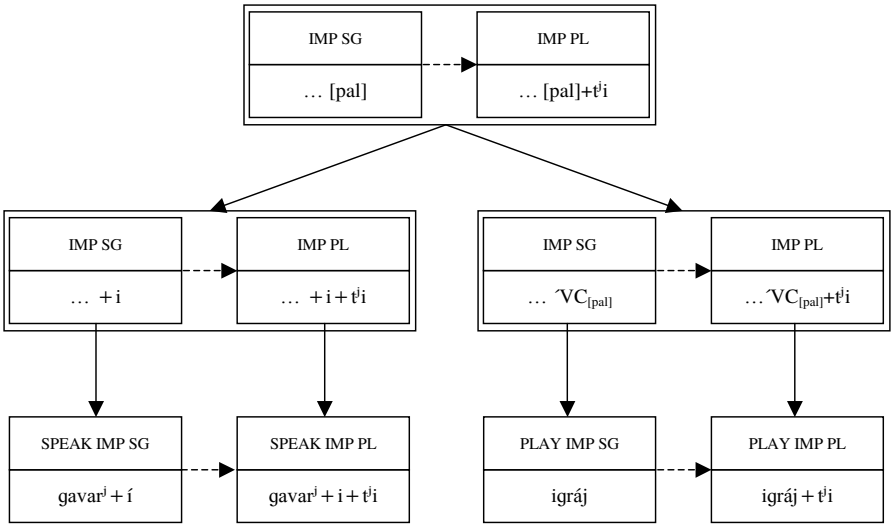

Figure 8.3. Structured network for the imperative singular and plural

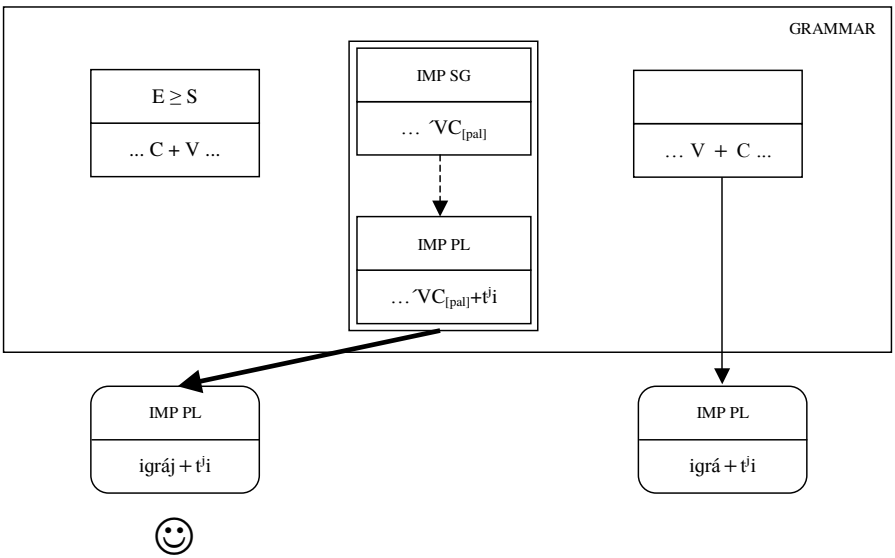

Figure 8.4. Schema interaction for opaque underapplication in the imperative pl

does not gain any support from the default schemas, since these schemas only cover V+C or C+V patterns. The rightmost candidate, on the other hand, instantiates the schema to the right in the grammar, insofar as [a+t^{j}] is a V+C sequence. The two schemas for the default patterns proposed in chapter 5 therefore predict that the imperative plural form is [igrá+t^{j}i]. This is incorrect; it is the candidate to the left that represents the correct form. Fortunately, this candidate is compatible with the schema for the imperative in the middle. This schema is by far the most specific schema in the grammar. The candidate to the left therefore shows the highest degree of conceptual overlap with the grammar, and is correctly predicted to be the winner.

Figure 8.4 suggests that the opaque underapplication in the imperative plural can be accounted for in Cognitive Grammar. The second-order schema we have considered connects the imperative singular and plural forms, and thus models a relation of the type Bybee (1985: 50–58) refers to as "basic-derived relation" and Wurzel (1984: 116–124 and 1989: 112–121) calls "paradigm structure condition". Employing morphological relations of this sort, the analysis of opaque underapplication lends additional support to the morphological approach to opacity I proposed in section 8.2.

It is interesting to note that an essentially morphological approach to opacity has been proposed within Optimality Theory too. In his theory of Optimal Paradigms, McCarthy (2005) takes the morphological notion of "inflectional paradigm" as his point of departure and analyzes the relationships between the members of the paradigm. Notice, however, that in McCarthy's conception all members of the paradigm have an equal status and the relations between them are symmetric. There is no equivalent to asymmetric basic-derived relations or "paradigm structure conditions" that can be represented by means of second-order schemas in Cognitive Grammar. Closer to Cognitive Grammar is so-called output-output faithfulness (Benua 1997), which facilitates the explication of asymmetric relationships between surface forms in Optimality Theory. Other optimality-based approaches to opacity cannot be modeled in Cognitive Grammar, because they are at variance with fundamental assumptions in cognitive linguistics. Turbidity Theory (Goldrick 2000), Virtual Phonology (Bye 2002) and Biaspectual Phonology (Blaho and Bye to appear), for instance, countenance covert (i.e. non-pronounced) material in the phonological output, while Sympathy Theory (McCarthy 1999 and 2003) draws on relationships to candidates that are not attested on the surface. McCarthy's (2007) recent theory of "candidate chains" incorporate phonological derivations into Optimality Theory. It is hard to see how these ideas could be reconciled with the content requirement that only permits structures attested in utterances and schemas over such structures. An evaluation of these and other approaches to opacity

couched in Optimality Theory is beyond the scope of this book. However, this brief comparison testifies to the restrictiveness of Cognitive Grammar. The fact that Cognitive Grammar excludes several potential approaches as incompatible with fundamental assumptions in cognitive linguistics is a good thing, because it shows that Cognitive Grammar is restrictive and yields clear empirical predictions about the morphological nature of phonological opacity. In section 10.2, we shall see that the morphological approach bears on opacity in the softening alternation. The implications of the morphological approach to opacity deserve to be tested against data from languages other than Russian, but that task is beyond the scope of this book and must be left for future research.

8.4. Imperatives and product-oriented generalizations

The distinction between source- and product-oriented generalizations was introduced in section 2.5. In the following, we shall return to the generalization captured in the topmost schema in Figure 8.1 above. Since this generalization is of the product-oriented type, it lends support to Cognitive Grammar where (first-order) schemas are pivotal. In order to give an adequate analysis of the Russian imperative, we need a framework that enables us to capture product-oriented generalizations. Cognitive Grammar meets this requirement.

Let us, to start with, take another look at the structured category network for the imperative singular in section 8.1. The network comprises imperatives like [bros^{j}] 'throw' in palatalized consonants, as well as forms ending in the palatal consonant [j], e.g. [igra'j] 'play'. Both palatalized and palatal consonants have a palatal place of articulation; for palatalized consonants it is the secondary place, and for palatal consonants it is primary. The remaining imperatives in the figure, [maxn^{j}+í] 'wave', [kr^{j}íkn^{j}+i] 'cry' and [gavar^{j}+í] 'speak', all have the ending [i]. This is a front vowel articulated at the hard palate; it is essentially the vocalic counterpart to [j]. I propose the following generalization:

(5) The Russian imperative singular ends in a segment with a palatal place of articulation.

Notice that "ends in" refers to the final segment in the verb form as a whole. Some of the imperative forms consist of a bare stem ending in a palatal or palatalized segment, whereas for the imperatives in [i] it is the ending that is relevant for the generalization.

Recall from section 2.5 that source-oriented generalizations focus on modifications of a source (e.g. an underlying representation), while product-oriented generalizations specify the properties of a surface representation without ex-

plicating how it has been created. The generalization in (5) clearly is of the product-oriented sort; it describes a property of the imperative without relating it to a "source". In Figure 8.1, the generalization in (5) is captured by the topmost schema, which states that the imperative has the feature [pal(atal)] at the right edge, i.e. in the final segment.

Before we consider the theoretical significance of the generalization in (5), it must be pointed out that there are some exceptions. Since the emphasis in section 8.2 was not on the topmost schema, it was not necessary to discuss the exceptions there. At this point, however, a short discussion is required in order to show that the exceptions do not jeopardize the generalization in (5). As pointed out in Nesset (1998a: 253) the exceptions fall into four groups:

(6) a. Imperatives in an apico-postalveolar consonant, e.g. *rež'* 'cut'
b. Imperatives in an apico-postalveolar consonant + [ɨ], e.g. *reši* 'decide'
c. The isolated imperative *ljag* 'lie down'
d. Imperatives of verbs with incomplete paradigms: *na* 'here you are'

Although strictly speaking the apico-postalveolar [s̪, z̪] are neither palatal nor palatalized, they are articulated in the transition area between the alveolar ridge and the palate. The apico-postalveolar consonants also function in the same way as palatalized consonants in the softening alternation. We shall return to this fact in section 9.2; at this point it is sufficient to note the close relationship between post-alveolar and palatalized consonants in Russian. A similar point can be made about the imperatives in (6b). According to Jones and Ward (1969: 32), [ɨ] is articulated "in the front part of the area that is designated 'central' on the vowel quadrilateral", so it is phonetically very close to palatal sounds proper. There is furthermore a functional relationship that ties [ɨ] to [i]; as pointed out in section 3.2, [ɨ] is an allophone of the /i/ phoneme that occurs after non-palatal(ized) sounds.

Detailed discussion of (6c) is not necessary, because (6c) concerns only one isolated verb. Notice, however, that although it ends in a velar consonant, it can be considered a pseudo-exception. Russian phonology does not permit palatal obstruents in word-final position. In a sense, therefore, the condition that imperatives end in a segment with a palatal place of articulation is overridden by the absolute ban on palatal obstruents word-finally. It is worth mentioning that the highly irregular *ljag* alternates with the more regular *ljaž'* in substandard Russian. A corpus search in the Russian National Corpus gave 12 hits for *ljaž'* and 64 for *ljag*. A Google search gave about 9.950 hits for *ljaž'* and 15.100 for *ljag*[88]

88 The Russian National Corpus is available at www.ruscorpora.ru. The corpus searches were performed on March 31, 2005.

A small group of elements like *na* 'here you are' are traditionally classified as interjections or particles (Švedova (ed.) 1980: 734), but it makes sense to analyze them as verbs that only have imperative forms, i.e. verbs with incomplete paradigms (cf. Nesset 1998a: 265). Not only are they semantically close to imperatives in that they express address or will, they also combine with objects in the accusative case (e.g. *topor* 'axe') and the verbal plural ending [tʲi]:

(7) Stepa, Efim, nate topor (ACC.SG) – zarubite menja, ja prošu, zarubite menja na melkie kuski. (Arkadij L'vov: *Dvor* (1981))[89]
'Stepa, Efim, take the axe – chop me, please, chop me into small pieces.'

While there is no denying that the exceptions in (6) exist, they represent small classes and/or are closely related to the imperatives that comply with the generalization in (5). The exceptions are non-prototypical, but they relate to the prototypical members of the imperative category. In view of this, it seems fair to say that (5) is a generalization that one should seek to account for in an analysis of the Russian imperative, i.e. what is often referred to as a "linguistically significant generalization". As we have seen that the generalization can be straightforwardly accommodated in a schema, the question arises as to whether a rule-based approach can do equally well. The answer is clearly in the negative. As shown in section 8.1, a rule-based analysis of the imperative involves an imperative deletion rule and a truncation rule. In addition, we need a rule that palatalizes the segment before the /i/ ending. Halle (1963) and Lightner (1972: 12) proposed rules to this effect, but we shall not go into detail here. For present purposes it is sufficient to notice that these rules in various combinations generate the correct surface forms. However, there is nothing in each rule that makes explicit that the final segment in the imperative is palatal(ized). This result emerges as a coincidence of the interaction of the rules. The generalization in (5) is not made explicit anywhere in the rule-based analysis, and there is no straightforward way to capture the generalization in a model assuming only procedural rules applying to underlying representations. In other words, Cognitive Grammar gives us generalizations that are not easily captured in alternative frameworks.

Many linguists will recognize this argument as a variant of the rule conspiracy argument that goes back to Kisseberth (1970). Kisseberth observed that in Yawelmani two processes – epenthesis and deletion – "conspire" to produce the same result, viz. surface forms with no final clusters and no three-consonant clusters. Neither rule captures the generalization about the impermissible clusters in Yawelmani. In order to capture this generalization, procedural rules are

89 Example from the Russian National Corpus (www.ruscorpora.ru), corpus search performed on February 3, 2006.

not sufficient; one needs a way to state well-formedness conditions on surface forms. Markedness constraints in Optimality Theory do this job, and in this section we have seen that schemas of the type employed in Cognitive Grammar have the same effect. Importantly, no extra machinery is necessary – schemas are central and well motivated concepts in the model. Since product-oriented generalizations can be straightforwardly accommodated in Cognitive Grammar, the imperative provides evidence in favor of this framework.

8.5. Conclusion

The analysis of exceptional imperatives in this chapter has illustrated how Cognitive Grammar can account for product-oriented generalizations in terms of first-order schemas. We have furthermore seen that Cognitive Grammar facilitates a morphological approach to phonological opacity in terms of overriding schemas for morphological forms and relations between them.

While this chapter has focused on imperatives that do not conform to the default C+V pattern, they do not jeopardize the analysis in chapter 5. First, the exceptional imperatives can be accounted for by means of overriding schemas, so it is not necessary to revise the default schema. Secondly, we have seen that both exceptional and regular imperatives are related through a product-oriented generalization stating that the imperative singular ends in a segment with a palatal place of articulation. This chapter completes the analysis of the truncation alternation in chapters 5 through 8. In the two following chapters we turn to the softening alternation, before we consider the interaction between the two sets of alternations in chapter 11.

Chapter 9
Palatalization and lenition: The softening alternation

Palatalization and lenition are widespread cross-linguistically, and it is therefore important to develop a cognitive approach to these phenomena. This is the topic of the present chapter, which focuses on the softening alternation. I argue that the complexity of the softening alternation derives from the interaction of palatalization and lenition. Once these phenomena are properly distinguished, broad generalizations can be formulated that encompass all types and subtypes of the softening alternation. I propose capturing the generalizations in terms of structured networks of second-order schemas that interact with first-order schemas representing sections of the Russian segment inventory.

Recall from section 4.7 that the softening alternation is a cover term for two types of alternation: "plain" (e.g. [s] ~ [sʲ] in [nʲos] '(he) carried' ~ [nʲisʲ-ót] '(s/he) carries') and "transitive" (e.g. [s] ~ [ʂ] in [pʲisá-l] '(he) wrote' ~ [pʲíʂ-it] '(s/he) writes'). Two questions are central. How can we characterize the relationship between the alternants? How can we characterize the environment conditioning the alternation? We shall return to the latter question in chapter 10; the present chapter is devoted to the relationship between the alternants in the plain (section 9.1) and transitive softening alternation (sections 9.2 and 9.3).

9.1. Plain softening: Palatalization

In section 4.7, I argued that there are five subtypes of plain softening that should be taken into consideration, although only three of them are attested in conjugation. All five subtypes are included in Table 9.1. In the leftmost column, I characterize the subtypes. I regard subtypes 1 and 2, which cover the larger classes of segments, as defaults that apply whenever the alternating segments do not meet the descriptions in the smaller subtypes 3–5. Subtypes 1 and 2 differ insofar as the former has a "plain" segment with no secondary place of articulation as its standard, whereas the standard of subtype 2 is palatalized. For each subtype, I give one alternation and a nominal and verbal example (when available). For a list of all attested alternations for each subtype, the reader may consult Table 4.4 in section 4.7.

Table 9.1. The plain softening alternation – five subtypes

Subtype	Standard	Target	Example
1. Default (hard)	plain	palatalized	s ∼ s^{j}:
			nos ∼ nós^{j}-i 'nose (Nom sg ∼ Loc sg)'
			n^{j}is-ú ∼ n^{j}is^{j}-í 'carry (1 sg pres ∼ imp sg)'
2. Default (soft)	palatalized	palatalized	s^{j} ∼ s^{j}:
			los^{j} ∼ lós^{j}-i 'elk (Nom sg ∼ Loc sg)'
3. Dorsal sonorant	palatal	palatal	j ∼ j:
			sloj ∼ slój-i 'layer (Nom sg ∼ Loc sg)'
			mój-u ∼ moj 'wash (1 sg pres ∼ imp sg)'[90]
4. Dorsal obstruent	velar	palatal	k ∼ c:
			sok ∼ sóc-i 'juice (Nom sg ∼ Loc sg)'
			p^{j}ik-ú ∼ p^{j}ic-í 'bake (1 sg pres∼imp sg)'
5. Lateral	velarized	palatalized	l^{x} ∼ l^{j}:
			zal^{x} ∼ zál^{j}-i 'hall (Nom sg ∼ Loc sg)'[91]

The question now arises as to whether and how these patterns can be accounted for in Cognitive Grammar. The solution I propose is to employ second-order schemas. Upon encountering verb forms like the 1 sg present tense [n^{j}is-ú] and the imperative sg [n^{j}is^{j}-í], language users may notice that the former has [s] and the latter [s^{j}] in root-final position. Language users may posit schemas for both forms, and also connect the schemas by means of an extension relation, since the forms are similar. In the same way, speakers may establish schemas for the forms of the verbs *trjasti* 'shake' and *pasti* 'graze', which involve the same alternation, and relate them in terms of extension relations. Similar schemas and relations may also be established for other syntactic categories, e.g. nouns of the type listed in Table 9.1. It is furthermore possible that speakers may notice that all the relations are of the same type, i.e. that they constitute a systematic aspect of the Russian grammar. This generalization can be captured by invoking

90 In the case of non-labial sonorants, the plain and transitive softening alternations have the same targets. I analyze the alternations in the non-suffixed verb *myt'* 'wash' as an instance of plain softening, since other verbs of this type show plain softening. In section 10.1, I shall also tentatively suggest analyzing the [j] ∼ [j] alternation in suffixed verbs like *igrat'* 'play' as an instance of the plain softening alternation.

91 Notice that the [l^{x}] ∼ [l^{j}] alternation is attested in verbs with the verbal suffix [o] (e.g. *kolot'* 'stab'). However, I consider this alternation an example of the transitive softening alternation, since it occurs in an environment that is characteristic for the transitive softening alternation.

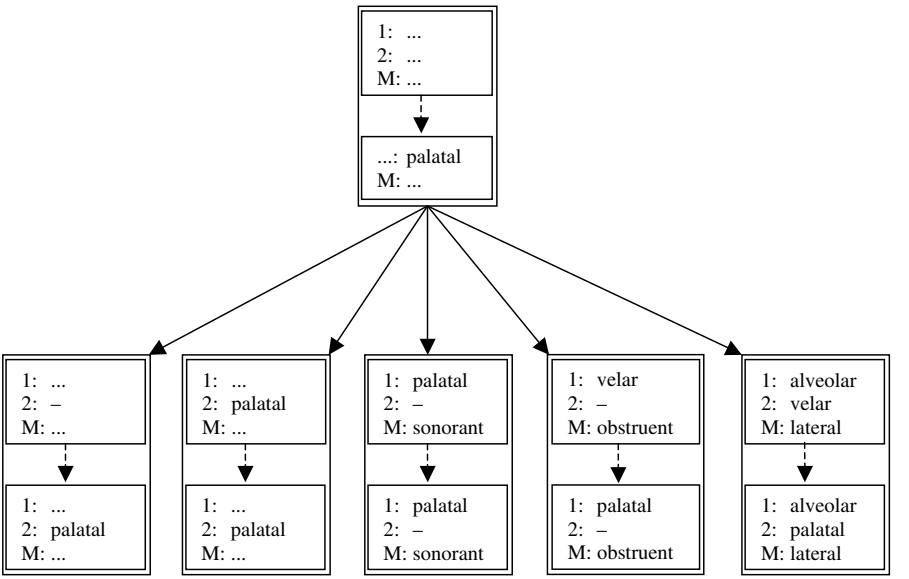

Figure 9.1. A structured network for the plain softening alternation

a second-order schema over all the extension relations between [s] and [s^{j}]. In a similar way, language users may establish schemas for other alternations of subtype 1, e.g. [t] ~ [t^{j}] and [d] ~ [d^{j}]. All these schemas can be related through a more general schema that covers all alternations in subtype 1. This schema is given to the left in the lower portion of Figure 9.1. A remark on notation is necessary. The upper box in each schema represents the standard, while the lower box stands for the target. In section 3.3, I outlined a feature geometry for hard and soft segments in Russian, but in Figure 9.1 I have chosen a somewhat simpler format in order to save space. Each box has three slots, one for the primary place of articulation (marked "1"), one for the secondary place (marked "2"), and one for the relevant manner features (marked "M"). In the schema for subtype 1, the slots for primary place and manner are supplied with suspension points. The schema is therefore compatible with any specifications for these slots. In this way, we capture the generalization that subtype 1 is a default pattern. The dash in the upper box clarifies that the relevant standards do not have a secondary place of articulation. The corresponding slot for the target contains the feature [palatal]. In this way we capture the generalization that we are dealing with a generalization between "plain" segments with no secondary place of articulation and palatalized segments with a palatal secondary place of articulation.

The remaining schemas in the lower portion of Figure 9.1 represent subtypes 2–5 in numerical order from left to right. It is interesting to notice that it is possible to state a more general schema that covers all the subtypes of the plain softening alternation. The topmost schema in Figure 9.1 does not involve any specifications of the standard, since almost all Russian consonants are possible standards in the alternation. The targets also show a great deal of variation, so there is not much to be said about them either in the topmost schema. However, as can be seen from the schemas in the lower portion of the figure, the target always contains the feature [palatal]. This feature is the primary place of articulation in subtypes 3 and 4, but otherwise it is the secondary place. In order to represent this in the topmost schema, I have included suspension points before [palatal], thus showing that this feature can be both primary and secondary place. In the heading of this section, I use the word "palatalization". The topmost schema in Figure 9.1 explains why – since the target always involves the feature [palatal], "palatalization" is a good characterization of the plain softening alternation.

There are two conclusions that can be drawn on the basis of Figure 9.1. First, the various types of alternation that are traditionally referred to as "plain softening" can be represented adequately as a network of second-order schemas. The network enables us to capture the diversity of the plain softening alternation. Secondly, the higher-level schema enables us to accommodate the information that all the subtypes share. In other words, we are in a position to capture the unity in the diversity that characterizes the plain softening alternation.

Before we move from the plain to the transitive softening alternation in the next section, recall from section 4.7 that plain softening is blocked for three consonants: [ʂ, ʐ, ts]. In standard Russian, these segments remain non-palatalized in environments where otherwise only palatalized consonants occur. The following examples illustrate this; non-palatalized [ʂ, ʐ, ts] occur before the locative ending [e], where we would expect palatalized segments:

(1)	a.	[ʂ] ∼ [ʂ]:	[lapʂ-á]	∼	[lapʂ-é]	'noodles (Nom∼Loc)'
	b.	[ʐ] ∼ [ʐ]:	[barʐ-á]	∼	[barʐ-é]	'barge (Nom∼Loc)'
	c.	[ts] ∼ [ts]:	[lʲits-ó]	∼	[lʲits-é]	'face (Nom∼Loc)'

I propose accounting for the blocking of the plain softening alternation by means of a specific schema that overrides the schema for the default pattern. Consider Figure 9.2, where two competing schemas are included in the grammar. The schema to the left is the schema for the default subtype 1 discussed above. The schema to the right states that apico-postalveolar fricatives with no secondary place of articulation alternate with consonants with the same specifications. This is tantamount to saying that apico-postalveolar fricatives remain non-palatalized in all environments, and thus captures the generalization that plain softening is

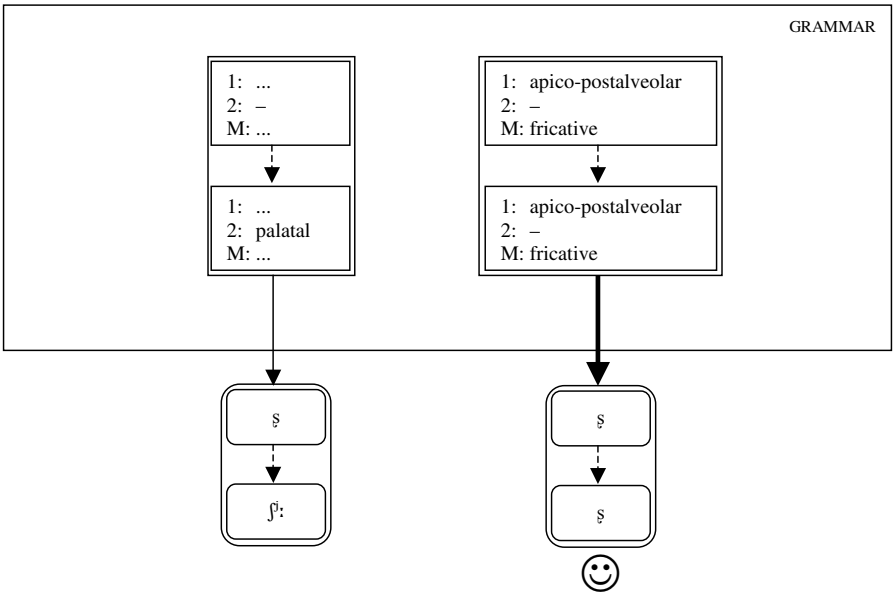

Figure 9.2. Blocking of the plain softening alternation

blocked for these segments. Notice that the schema only covers [ʂ, ʐ]. There is no simple way to describe [ʂ, ʐ] and [ts] by means of features that at the same time exclude all other Russian consonants. It would therefore be necessary to advance a separate schema for [ts], but since this is not relevant for the example in Figure 9.2, I have not included such a schema in the grammar fragment in the figure.

The figure contains two candidates. The left candidate represents an alternation between [ʂ] and the most closely related palatalized consonant in Russian, viz. [ʃʲː]. The rightmost candidate stands for blocking, where [ʂ] alternates vacuously with itself. The leftmost candidate overlaps with the default schema, and the rightmost candidate with the blocking schema to the right. Since the blocking schema is more specific, the rightmost schema shows the higher degree of conceptual overlap and is therefore correctly predicted to be the winner.

9.2. Transitive softening: Palatalization

One of the reasons why the transitive softening alternation is so complex is that it involves both palatalization (in a wide sense) and lenition. By way of example,

consider the alternation [t] ∼ [tʃʲ]. Here, a non-palatalized consonant alternates with a palatalized consonant, so we are dealing with palatalization in the same way as for the plain softening alternation (e.g. [t] ∼ [tʲ]) discussed in the previous section. At the same time, however, the manner of articulation is affected in the transitive softening alternation. In [t] ∼ [tʃʲ], for instance, the target is an affricate, while the standard is a plosive. This is an example of lenition; as opposed to the standard (the plosive [t]), the target (the affricate [tʃʲ]) does not have a complete closure. We shall return to lenition in the next section. In this section, we shall see that the palatalization aspect of transitive softening can be adequately accommodated as a network of second-order schemas. Furthermore, we shall see that these second-order schemas interact with schemas representing sections of the segment inventory of Russian.

In section 4.7 I discussed the subtypes of the transitive softening alternation. Table 9.2 gives a description of the standard and target of each subtype, as well as two examples for each subtype, one with a palatalized and one with a non-palatalized standard. Full lists of the alternations are given in section 4.7; recall that types 1 and 2 represent fairly large classes of segments, while types 3 and 4 are smaller. Since palatalized and non-palatalized standards correspond to the same targets, the opposition between hard and soft consonants is neutralized in the target. In this way, the transitive softening alternation resembles the plain softening alternation discussed in the previous section. But the tran-

Table 9.2. The transitive softening alternation – four subtypes

Standard	Target	Examples
1. [labial]	[labial] + [lʲ]	p ∼ plʲ: kápa-tʲ ∼ káplʲ-it ‘drip (inf∼3 sg pres)’ pʲ ∼ plʲ: kupʲí-tʲ ∼ kuplʲ-ú ‘buy (inf∼1 sg pres)’
2. [lingual, obstruent]	[post-alveolar, obstruent]	t ∼ tʃʲ: prʲáta-tʲ ∼ prʲátʃʲ-it ‘hide (inf∼3 sg pres)’ tʲ ∼ tʃʲ: trátʲi-tʲ ∼ trátʃʲ-u ‘spend (inf∼1 sg pres)’
3. [lingual, sonorant]	[lingual sonorant, palatalized]	r ∼ rʲ: paró-tʲ ∼ pórʲ-it ‘flog (inf∼3 sg pres)’ rʲ ∼ rʲ: gavarʲí-tʲ ∼ gavarʲ-ú ‘speak (inf∼1 sg pres)’
4. [palatal, sonorant]	[palatal, sonorant]	j ∼ j: tája-tʲ ∼ táj-it ‘melt (inf∼3 sg pres)’

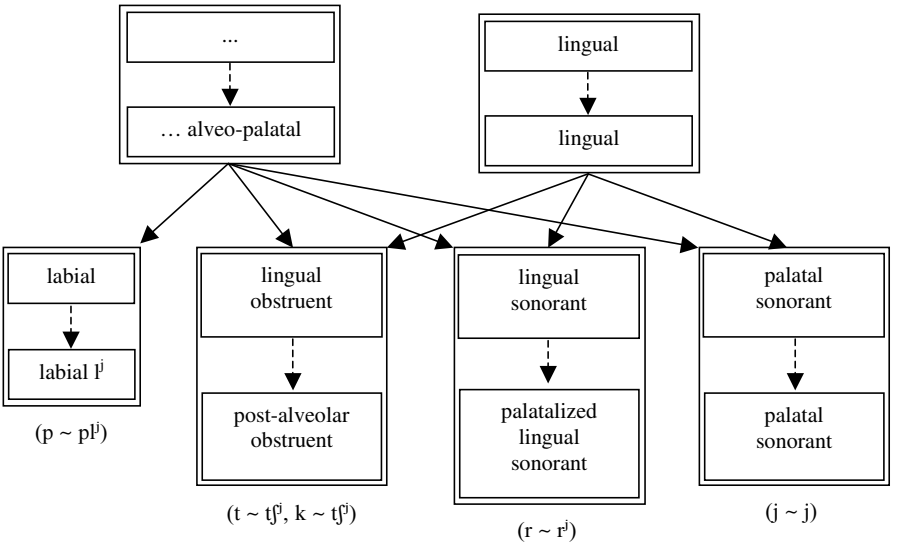

Figure 9.3. The transitive softening alternation as palatalization

sitive softening alternation also involves neutralization of other oppositions, a fact that is made very clear in the thorough classification proposed in Andersen (1995). For present purposes, it is sufficient to mention two facts. First, in standards, Russian distinguishes between alveolar, post-alveolar and dorsal obstruent phonemes (e.g. /t, tʃʲ, k/), but only post-alveolar obstruents are attested as targets in the transitive softening alternation. Second, Russian has contrastive plosives, affricates and fricatives (e.g. /t, tʃʲ, s̡/), but as targets in the transitive softening alternation, plosives are not attested. In other words, the number of contrastive segments is smaller for targets than standards, and it is thus clear that the transitive softening alternation involves neutralization in the same sense as the examples discussed in sections 3.7–3.9. In the following, however, I shall not focus on neutralization, since this topic was treated in detail in chapter 6.

In the same way as in the preceding section, I propose representing the alternations in terms of second-order schemas that consist of two schemas connected by an extension relation. In the lower portion of Figure 9.3, I give one schema for each of the four subtypes. For the convenience of the reader, examples of the relevant alternations are given under the schemas. The upper box in each second-order schema represents the standard in the alternation, while the lower box refers to the target. Subtype 1, which concerns labials, deserves special mention. Instead of replacing the labial by a sound articulated in the alveo-palatal region, the language keeps the labial as it is, but adds the palatalized lateral [lʲ]

after the labial. In other words, the target is a consonant cluster, rather than a single consonant. This generalization is captured in the leftmost schema at the bottom of Figure 9.3.

The three schemas to the right in the lower portion of Figure 9.3 represent subtypes 2–4 from Table 9.2. These patterns concern alveolar, post-alveolar and dorsal segments. If we adopt the feature [lingual] as a cover term for the non-labial places of articulation, we are in a position to state the following generalization:

(2) Lingual standards alternate with lingual targets, whereas labial standards correspond to targets consisting of the same labial followed by [lʲ].

The second part of this generalization is captured in the schema at the lower left. In order to capture the first part of the generalization in (2), I propose the schema at the upper right in Figure 9.3. Generalizing over the schemas for subtypes 2–4, this schema makes explicit that lingual consonants alternate with lingual consonants, regardless of whether we are dealing with obstruents or sonorants, which otherwise behave differently with regard to the transitive softening alternation.

In the previous section, it was argued that the plain softening alternation is an example of palatalization, insofar as the target always involves the feature [palatal]. Does the same hold for the transitive softening alternation? For subtypes 3 and 4, the answer is clearly in the affirmative, insofar as these subtypes have palatalized or palatal segments as targets. The targets in the labial subtype 1 also contain the feature [palatal]. As we have seen, the target is a consonant cluster consisting of a labial followed by the palatalized lateral [lʲ]. Subtype 2 concerning lingual obstruents is more complex, although some of the possible targets for this subtype are palatalized: [tʃʲ, ʃʲː, ʒʲː]. However, the other two targets, the apico-postalveolar fricatives [s̻, z̻], are not, phonetically speaking, palatal or palatalized. Nevertheless, these sounds are articulated very close to palatal(ized) segments, more precisely in the post-alveolar area, i.e. the transitional area between the alveoli and the hard palate. In other words, it is not the case that we are dealing with the set of palatal(ized) consonants plus two random segments, say, [p] and [n]. This motivates the following generalization, where "alveo-palatal" is used as a cover term for post-alveolar and palatal(ized) segments:

(3) The targets in the transitive softening alternation have an alveo-palatal (primary or secondary) place of articulation at their right edge.

Notice that it is necessary to mention the right edge; since labials alternate with clusters consisting of a labial followed by [lʲ], the left segment in the target need not be palatalized.[92]

Does the generalization in (3) justify the use of the term "palatalization"? As the term is often used, it refers to processes or alternations whereby a consonant acquires an alveo-palatal place of articulation (cf. e.g. Goldsmith (ed.) 1995: 294–295), so referring to the transitive softening alternation as "palatalization" seems reasonable. Essentially, however, this is a terminological issue. More important is the question as to whether and how the generalization in (3) can be adequately represented in Cognitive Grammar. In a model with underlying representations one might postulate that the surface segments [s̬, z̬] correspond to palatalized consonants in underlying representation. An analysis along such lines is not available in Cognitive Grammar, which does not have underlying representations. However, the schema at the upper left in Figure 9.3 captures the generalization in (3), insofar as it states that the target has an alveo-palatal segment at the right edge. The suspension points represent the fact that the target may or may not include a segment to the left of the alveo-palatal consonant.

The structured network in Figure 9.3 enables us to represent the properties of the subtypes of the transitive softening alternation, as well as broad generalizations ranging over three or four subtypes. We shall now see that the second-order schemas interact with schemas capturing aspects of the Russian segment inventory. As mentioned, the two targets [s̬, z̬] enjoy a special status in that they are neither palatal nor palatalized. The question is why one does not get palatal or palatalized targets instead. I would like to suggest that the nature of the Russian segment inventory is relevant. Since the inventory does not provide appropriate palatalized segments, the language user is forced, as it were, to accept the closely related [z̬, s̬] as a second-best option. The grammar fragment in Figure 9.4 is constructed so as to accommodate this intuition. The complex schema in the middle is taken from Figure 9.3; the other schemas in the network are left out as they are not relevant for the problem under scrutiny. In addition, two simple schemas representing possible Russian segments are included in the figure. The schema to the left states that [s̬] is part of the Russian segment inventory, while the schema to the right states that the inventory also comprises [ʃʲː]. Notice the difference in duration; as pointed out in section 3.2, [ʃʲː] has a distinctly longer duration than "ordinary" Russian consonants, and is often analyzed as a conso-

92 As mentioned in section 3.8, there is considerable variation as far as regressive softening in consonant clusters is concerned. While some speakers may palatalize the first member of a cluster consisting of a labial plus [lʲ], this is not the variety of speech that forms the basis of this book.

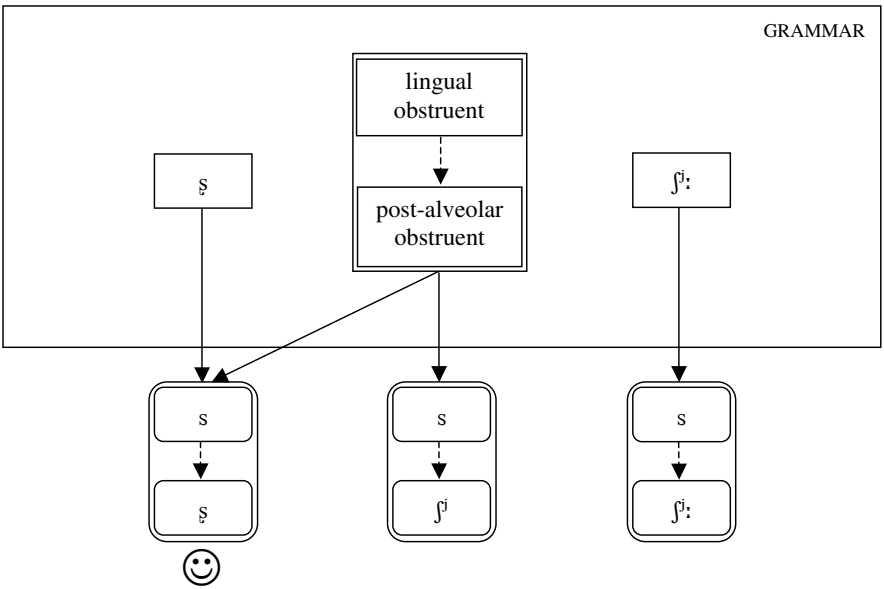

Figure 9.4. Non-palatal(ized) targets in the transitive softening alternation

nant cluster. Since the two schemas to the left in Figure 9.4 do not contain the length marker [ː], they are compatible with segments of normal duration only.

Figure 9.4 contains three candidates with three conceivable targets: [s̬, ʃʲ, ʃʲː]. Assuming that the complex schema in the middle is compatible with segments of normal duration only, the two leftmost candidates are instantiations of this schema. The candidate to the left in addition gains support from the leftmost schema in the grammar, since [s̬] is a possible segment in Russian. The candidate in the middle receives no such support, as the Russian segment inventory does not contain the short [ʃʲ]. Since the leftmost candidate instantiates two schemas while the remaining candidates only instantiate one schema each, the leftmost candidate involves the highest degree of conceptual overlap. This candidate is therefore predicted to be the winner – a prediction that is borne out by the facts.

The grammar fragment in Figure 9.4 is constructed so as to prefer [s̬,] over [ʃʲː]. However, as pointed out in section 4.7, there are cases where [ʃʲː] occur as the target in a transitive softening alternation. By way of illustration, we shall look at one such case where the cluster [st] alternates with [ʃʲː]. The verb *xlestat'* 'whip', for instance, has [st] in root-final position in the infinitive ([xlʲistá-tʲ]), but [ʃʲː] in the 1 singular present tense ([xlʲiʃʲː-ú]). In order to account for examples

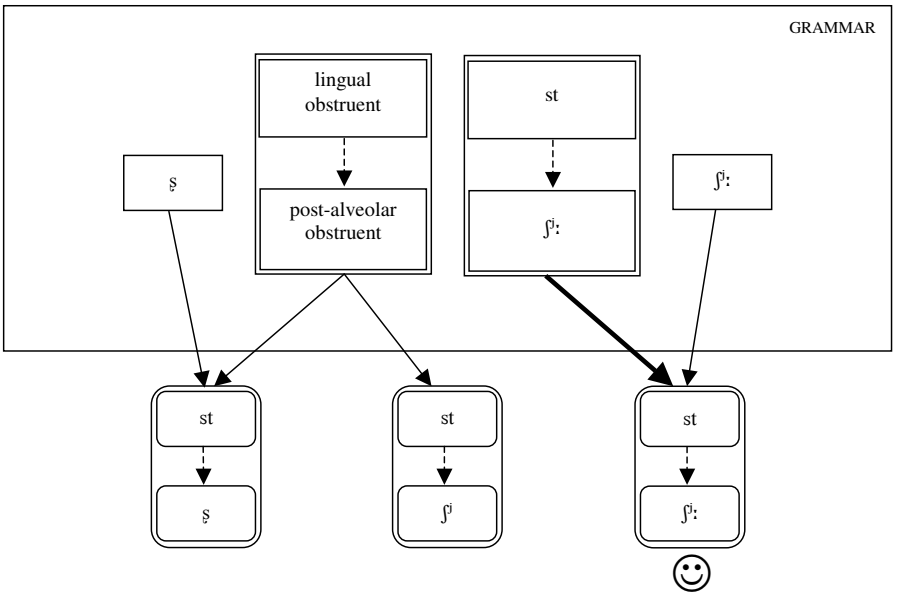

Figure 9.5. [ʃʲː] as a target in the transitive softening alternation

like this, I have added a schema for the [st] ~ [ʃʲː] alternation in Figure 9.5. This schema is more specific than the competing second-order schema in the figure in that it contains more details about the alternating segments. While the competing schema only describes the standard as a lingual obstruent, the more specific schema involves two fully specified segments: [st]. For the targets, the specific schema describes it as [ʃʲː], while the other schema only contains the features [post-alveolar] and [obstruent]. As a consequence of this, the candidate to the right involves a higher degree of conceptual overlap with the grammar, as shown by the thick arrow. While two candidates instantiate two schemas in the grammar, the candidate to the right involves the higher degree of conceptual overlap and is therefore correctly predicted to be the winner.

In the previous section, I made the point that Cognitive Grammar facilitates a straightforward account of the plain softening alternation as palatalization. The discussion of the transitive softening alternation in the present section reinforces this conclusion. The structured network of second-order schemas in Figure 9.3 allows us to accommodate the various subtypes and at the same time capture the similarities across the subtypes. In addition to this, I have suggested that the second-order schemas interact with schemas for aspects of the segment inventory, and that this interaction enables us to predict the correct targets for the transitive softening alternation.

9.3. Transitive softening: Lenition

In this section we shall consider the transitive softening alternation from the point of view of lenition. Andersen (1969b) discussed the historical changes that created the transitive softening alternation in modern Russian as examples of lenition, and this perspective, it will be argued, is rewarding for present-day Russian too. Broad generalizations can be stated as second-order schemas that interact with the segment inventory. Cognitive Grammar enables us to relate all subtypes of the transitive softening alternation, including the pattern for labials, which I propose involve lenition.

Lenition (weakening) may be defined as a process, which "increases the permeability of the vocal tract to airflow" (Lass 1984: 177). Alternations like [d] ~ [z̧] comply with this definition since the target (a fricative) restricts the airflow less than the standard (a plosive). Let us start by considering lingual sounds. In Figure 9.6, I have arranged the alternations on a scale ranging from plosives (strongest) to sonorants (weakest).[93] Lines connect the standards and targets in each alternation. Only alternations attested in conjugation are included, and in order to avoid unnecessary complications I do not consider standards consisting of two segments ([st, sk, zg]) or targets that reflect Church Slavic influence. The figure shows that lenition is attested for the strongest segments, viz. plosives, while for other segments the standard and target are on the same level on the scale. In other words, lenition is relevant for the transitive softening alternation, but it does not apply across the board.

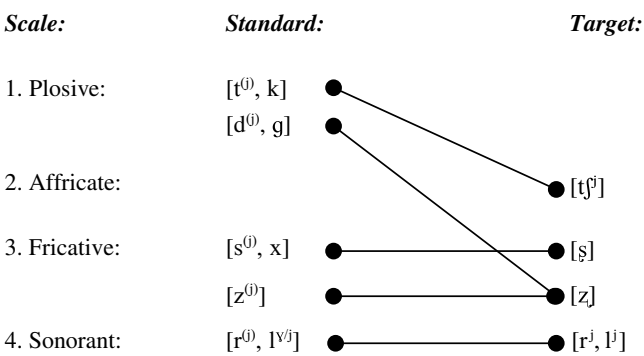

Figure 9.6. Leniton in the transitive softening alternation (lingual segments)

93 Notice that I place affricates between plosives and fricatives, since affricates are complex segments, which can be analyzed as a sequence of a plosive and a fricative within one timing unit. For evidence that affrication is lenition, see Bybee (2001: 80).

Figure 9.6 suggests the following generalizations: [94]

(4) a. The target ends in a continuant.
b. Voiced standards alternate with voiced targets.
c. Voiceless standards alternate with targets that begin with a voiceless segment.
d. Sonorant standards alternate with sonorant targets.
e. Obstruent standards alternate with targets that begin with an obstruent.

Figure 9.6 concerns lingual obstruents and sonorants, but the generalizations in (4) encompass labial segments as well. Recall from the preceding section that labial standards alternate with a sequence consisting of the same labial followed by the lateral [lʲ]. The lateral is a continuant, insofar as it involves uninterrupted airflow through the oral cavity. The labial subtype of the transitive softening alternation therefore complies with generalization (4a). For this reason, I propose classifying alternations like [p] ∼ [plʲ] as examples of lenition. Crucially, the second part of the target is a continuant, and the airflow is therefore obstructed to a lesser degree in the target than in the standard (the plosive [p]). This being said, however, it should be pointed out that there are differences between the labial and lingual subtypes of the transitive softening alternation. While the target in the lingual subtype is always one segment (albeit sometimes the complex segment [tʃʲ]), the labial subtype has targets consisting of two segments. The labial subtype furthermore differs in that the target always ends in a sonorant; as we have seen, lingual standards accept obstruent targets.

Whereas (4a) captures the generalization that the transitive softening alternation involves lenition, (4b-e) can be compared to faithfulness constraints in Optimality Theory, in that they constrain the amount of permissible variation between the standard and target. In (4b) it is stated that voiceless segments alternate with voiceless segments, while (4c) captures the generalization that voiced standards correspond to voiced targets. In other words, alternations between segments with different voicing specifications are not attested. Notice that the

94 It would be possible to conflate generalizations (4b-c) and (4d-e) by means of binary features and alpha notation. However, I shall not explore the merits of this notation in the following. Generalizations (4b-e) are without exceptions, but there is one exception from (4a) that deserves mention. All the targets in Figure 9.6 end in a continuant. Notice that the condition "ends in" is necessary in order to cover the affricate [tʃʲ], which *starts* with a plosive, but *ends* in a fricative. However, the alternation [nʲ] ∼ [nʲ], which is not represented in the figure, is problematic. The target [nʲ] is not a continuant, insofar as the air flow through the mouth is blocked, so it is not involve is a nasal stop. Nevertheless, I include (4a) in the list of generalizations, since it holds good for the vast majority of alternations.

generalization for voiceless segments in (4b) refers to the first part of the target. This is necessary in order to encompass the labial subtype, where the target always ends in the voiced [lʲ].

Generalizations (4d-e) concern the distinction between obstruents and sonorants. In the transitive softening alternation, obstruents alternate with obstruents and sonorants with sonorants. Alternations between obstruents and sonorants are not permitted. In the same way as for (4c), (4e) refers to the beginning of the target. In this way, we accommodate the labial subtype where it is the first part of the target that "copies" the specifications of the standard.

At this point the question arises as to whether the generalizations in (4) can be accounted for in Cognitive Grammar. Figure 9.7 suggests that the answer is in the affirmative. In the lower portion of the figure, I give second-order schemas for a representative class of alternations; for reasons of space it was impossible to include all alternations in the figure, but the examples are sufficient to support the argument. The upper portion of the figure contains five schemas that correspond to the generalizations listed in (4), including generalization (4a) about lenition proper. Notice the use of suspension points in the targets. The suspension points to the left in the leftmost schema (corresponding to (4a) show that the target can begin with any segment as long as it ends in a continuant. The schemas capturing generalizations (4c) and (4e) have suspension points to the right in the target. In this way we accommodate the fact that it is the first part of the target that shares the specifications [voiceless] and [obstruent] with the standard.

The structured network in Figure 9.7 captures the regularity of the transitive softening alternation. With only one exception, all the schemas in the lower portion instantiate three of the general schemas in the upper portion. This is the maximum. Since a segment cannot be both voiced and voiceless, generalizations (4b-c) exclude each other. Similarly, generalizations (4d-e) are mutually exclusive, insofar as there are no segments that are both obstruents and sonorants. In addition to accounting for the regularity of the transitive softening alternation, the structured network enables us to capture the exceptional status of [nʲ] ~ [nʲ]. Not involving a continuant, this pattern is at variance with the schema for lenition to the left in the upper portion of the network. The schema for [nʲ] ~ [nʲ] can be considered an override that takes precedence over the more general schema for lenition that covers the majority of the examples of the transitive softening alternation. In section 9.1, I made the point that structured networks enable us to account for both the unity and the diversity of the transitive softening alternation. The discussion in this section reinforces this conclusion since the network in Figure 9.7 both accommodates broad generalizations and exceptions.

The analysis of the transitive softening alternation as lenition relates to another point made in the previous section, insofar as the second-order schemas in

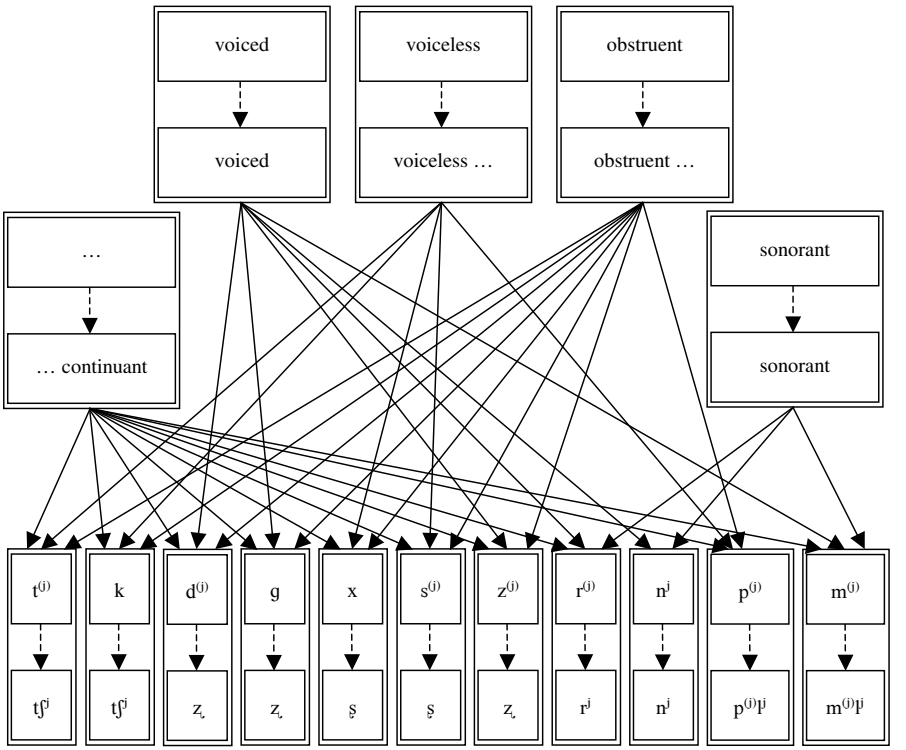

Figure 9.7. The transitive softening alternation as lenition

Figure 9.7 interact with the segment inventory of Russian. In order to drive this point home, I would like to discuss one example, [d] ~ [ʐ], which provides a good illustration. Figure 9.8 contains three candidates involving three conceiveable targets alternating with [d]. In all candidates the target is followed by a vowel represented as a capital V, since transitive softening only occurs in prevocalic position, a fact that will be of importance for the argument. The candidates are compared to a grammar fragment containing the three schemas from Figure 9.7 that correspond to generalizations (4a), (4b) and (4d). Since we are dealing with voiced obstruents, generalizations (4c) and (4e) are not relevant. Notice that the schemas in the lower portion of Figure 9.7 are not included in the grammar fragment either. Including them would make the selection of the correct winner trivial; the candidate with the [d] ~ [ʐ] alternation would win, since it would be the only candidate that would instantiate the schema for the [d] ~ [ʐ] alternation. Notice that this does not imply a claim that these schemas are excluded from the speakers' mental grammar. Whether the speakers' include all, some, or none of

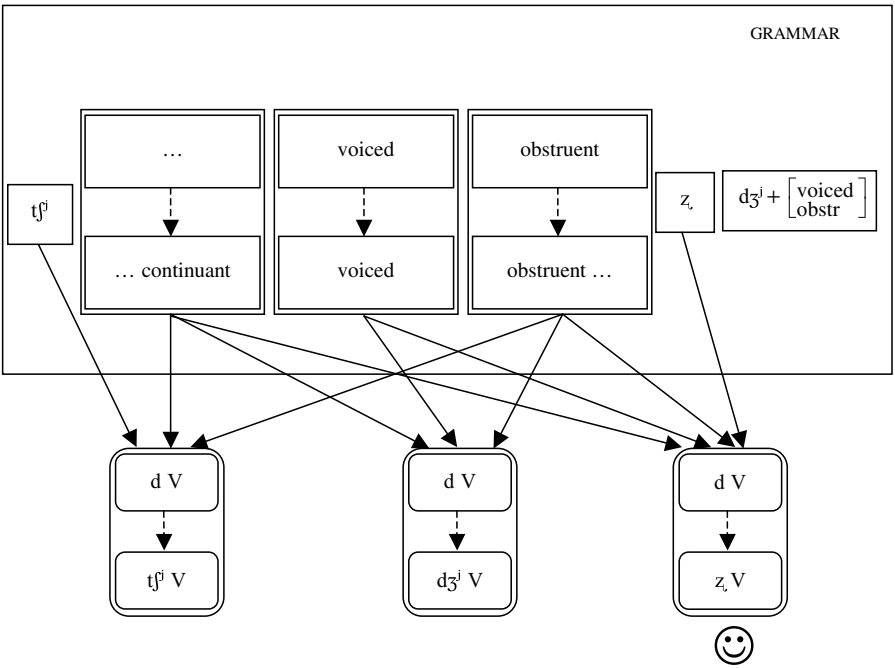

Figure 9.8. [ʐ] as a target in the transitive softening alternation

the schemas in their mental grammars is an empirical question that can be tested by means of psycholinguistic experiments. However, carrying out such tests is beyond the scope of the present study. In the present context the important point is that Cognitive Grammar facilitates a straightforward account of the broader generalizations in (4), and we shall therefore focus on the schemas encoding these generalizations in the following.

In addition to the three schemas from Figure 9.7, Figure 9.8 contains three phonological schemas. Two of them simply state that [tʃʲ] and [ʐ] are part of the Russian segment inventory. In traditional terminology, these segments have phoneme status in the language. As pointed out in section 3.1, they can therefore be represented as context-free schemas. The situation for the segment [dʒʲ], on the other hand, is different. While this consonant does occur in Russian, it is only attested in contexts conditioning regressive voicing assimilation (cf. section 3.7). In traditional terminology, it is an allophone of the /tʃʲ/ phoneme. In order to capture this generalization, the schema to the far left is included in the grammar. It states that [dʒʲ] occurs before a voiced obstruent over a morphological boundary represented as +. Admittedly, this description is somewhat

simplified, but it is sufficiently precise for present purposes, as the point here is to illustrate how the difference between contrastive and non-contrastive segments (phonemes and allophones) can be explicated in Cognitive Grammar. As mentioned, the former can be represented as context-free schemas, while the latter only occurs in schemas specifying a certain context. The "allophonic" schema is not activated in Figure 9.8, but a schema to this effect is required in the grammar of Russian in order to accommodate cases with regressive voicing assimilation. A relevant environment is provided by the subjunctive enclitic *by* when preceded by nouns ending in /tʃʲ/, e.g. *noč'* 'night'.

In Figure 9.8, the two candidates to the right satisfy all the schemas for transitive softening, insofar as in both cases the targets are voiced lingual obstruents with a continuant air-flow at the end. Since in transitive softening the target is in prevocalic position, the "allophonic" schema for [dʒʲ] is not relevant. The "phonemic" schemas, on the other hand, apply, since they are not restricted to any particular context. The rightmost candidate instantiates four schemas, and therefore displays the highest degree of conceptual overlap. It is thus predicted to be the winner. This prediction is borne out by the facts.

9.4. Conclusion

In this chapter, I have developed a cognitive approach to palatalization and lenition. By way of conclusion, I would like to highlight two aspects of the analysis. First, I have suggested that the complexity of the softening alternation is due to the interaction of palatalization and lenition. Keeping these phenomena distinct, I have advanced a number of broad generalizations that cover all types and subtypes of the alternation, including the labial subtype of the transitive softening alternation, which on the face of it behaves very differently from lingual segments. Second, I have shown how the generalizations can be captured in terms of structured networks of second-order schemas that interact with first-order schemas representing permissible segments. The analysis I have proposed shows that Cognitive Grammar offers an insightful account of palatalization and lenition, a conclusion that will be reinforced in the following chapter, which offers a detailed analysis of the environments that condition the softening alternation in Russian verb inflection.

Chapter 10
Opacity and non-modularity: Conditioning the softening alternation

Based on an analysis of the environment conditioning the softening alternation, this chapter addresses two theoretical issues revolving around the main topic of this book, viz. the interaction between phonology and morphology in Cognitive Grammar. Section 10.2 provides further evidence in favor of the morphological approach to phonological opacity, discussed in chapter 8. Sections 10.3 through 10.5 illustrate the advantages of a non-modular theory where syntax, morphology and phonology are not relegated to different components ("modules"), but rather interact directly in one large network of schemas. In sections 10.3 and 10.4, it is argued that the structure of inflectional paradigms influences the softening alternation, and it is shown how Cognitive Grammar provides an account of this factor in terms of second-order schemas. To balance the emphasis on morphology in the previous sections, section 10.5 considers the interaction between the softening alternation and the Russian segment inventory, thus granting a role for phonology proper in the environment conditioning the softening alternation. However, before we turn to the theoretical questions of opacity and non-modularity, I will present the data and state some broad generalizations about the predictability of the softening alternation. This is the topic of section 10.1.

10.1. Data and descriptive generalizations

In this section, we shall see that the softening alternation is conditioned by two factors. In order to predict whether a given verb form has softening or not, we need information about (a) the shape of the stem and (b) the ending's shape and meaning. Once this information is in place, straightforward generalizations can be stated. It is useful to distinguish between three patterns, which for convenience I label A, B and C. One example of each pattern is given in Table 10.1, where shaded cells contain the targets of the transitive softening alternation, while the targets of the plain softening alternation are given in framed cells.[95] For pattern

95 In the present study we are concerned with paradigm internal alternations, i.e. cases where both standard and target are found inside the same inflectional paradigm. Comparison of patterns B and C_1 in Table 10.1 illustrates this. In both patterns,

C, I consider two subpatterns, labeled C_1 and C_2. The softening alternation has the same distribution in both subpatterns, but C_2 is more complex in that it involves both the plain and the transitive version of the softening alternation. Notice that some of the example verbs in the table lack one or two forms in the paradigm. For completeness, forms of other verbs are provided in parentheses in the relevant cells.

Whether a verb belongs to pattern A, B or C depends on the verbal suffix:

(1) a. Suffix: [a, o], polysyllabic stem: Pattern A
b. Suffix: [i, e]: Pattern B
c. Elsewhere: Pattern C

The verb *mazat'* in Table 10.1 illustrates the occurrence of pattern A for verbs with the [a] suffix, but this pattern is also attested in verbs with the [o] suffix, e.g. *kolot'* 'stab'. Pattern A is restricted to verbs with polysyllabic stems. If the stem is monosyllabic, the verb belongs to pattern C. An example is *ždat'* 'wait', which has plain softening in the same cells in the present tense and imperative subparadigms as *vesti* 'lead' in Table 10.1.[96] Pattern B occurs when

[dʲ] is attested in stem-final position. In pattern C, palatalized [dʲ] alternates with non-palatalized [d]. This is therefore an example of plain softening, and the cells with palatalized [dʲ] are framed. In pattern B, on the other hand, non-palatalized [d] is not attested in the paradigm. In other words, there is no paradigm internal alternation and the cells with palatalized [dʲ] are therefore not framed. Notice that the pattern B verb *xodit'* 'walk' is related to the noun *xod* 'motion', where the root ends in a non-palatalized consonant. However, this alternation is beyond the scope of the present book since the alternants are not members of the same inflectional paradigm.

96 There are a few exceptions to the generalization that [a]-verbs with monosyllabic stems belong to pattern C, whereas verbs with polysyllabic stems follow pattern A. Among verbs with monosyllabic stems, the two irregular verbs *spat'* 'sleep' and *gnat'* 'herd' belong to pattern B (Švedova (ed.) 1980: 661), while *slat'* 'send' and *stlat'* 'spread' are in pattern A. However, the majority of the monosyllabic verbs belong to pattern C. The Russian Academy Grammar (Švedova (ed.) 1980: 655) lists the following: *brat'* 'take', *vrat'* 'lie', *drat'* 'flay', *ždat'* 'wait', *žrat'* 'devour', *zvat'* 'call', *lgat'* 'lie', *(po)prat'* 'crush', *rvat'* 'tear', *ržat'* 'neigh' and *tkat'* 'weave'. To this list one may add the taboo word *srat'* 'shit', although this verb is reported to vacillate between patterns A and C (Shapiro 1980: 75). Among verbs with polysyllabic stems, there are four verbs that belong to pattern C instead of A: *orat'* 'shout', *stonat'* 'moan', *žaždat'* 'crave' and *sosat'* 'suck'. Shapiro (1980: 75) classifies *žaždat'* and *sosat'* as reduplicative stems, but since we are dealing with only two verbs, I will not incorporate this feature in my analysis. Pattern A comprises well over 100 verbs, and the exceptions mentioned in this footnote do not bear on the theoretical issues to be discussed in this chapter.

Table 10.1. The transitive (shaded) and plain softening alternation (framed) in Russian conjugation

		A: 'smear'	B: 'walk'	C_1: 'lead'	C_2: 'clip'
Present	1 sg	máz$_{ʦ}$+u	xaz$_{ʦ}$+ú	v^{ʲ}id+ú	str^{ʲ}ig+ú
	2 sg	máz$_{ʦ}$+iṣ	xód^{ʲ}+iṣ	v^{ʲ}id^{ʲ}+óṣ	str^{ʲ}iz$_{ʦ}$+óṣ
	3 sg	máz$_{ʦ}$+it	xód^{ʲ}+it	v^{ʲ}id^{ʲ}+ót	str^{ʲ}iz$_{ʦ}$+ót
	1 pl	máz$_{ʦ}$+im	xód^{ʲ}+im	v^{ʲ}id^{ʲ}+óm	str^{ʲ}iz$_{ʦ}$+óm
	2 pl	máz$_{ʦ}$+it^{ʲ}i	xód^{ʲ}+it^{ʲ}i	v^{ʲ}id^{ʲ}+ót^{ʲ}i	str^{ʲ}iz$_{ʦ}$+ót^{ʲ}i
	3 pl	máz$_{ʦ}$+ut	xód^{ʲ}+at	v^{ʲ}id+út	str^{ʲ}ig+út
	Pass. part.	(kal^{ʲ}ébl^{ʲ}+imij[97])	(vad^{ʲ}+ímij[98])	v^{ʲ}id+ómij	(vl^{ʲ}ik+ómij[99])
	Act. part.	máz$_{ʦ}$+uʃ^{ʲ}ːij	xad^{ʲ}+áʃ^{ʲ}ːij	v^{ʲ}id+úʃ^{ʲ}ːij	str^{ʲ}ig+úʃ^{ʲ}ːij
	Gerund	máz$_{ʦ}$+a[100]	xad^{ʲ}+á	v^{ʲ}id^{ʲ}+á	(b^{ʲ}ir^{ʲ}iz$_{ʦ}$+á[101])
Imper.	2 singular	maz$_{ʦ}$	xad^{ʲ}+í	v^{ʲ}id^{ʲ}+í	str^{ʲ}iɟ+í
	2 plural	máṣ+t^{ʲ}i	xad^{ʲ}+ít^{ʲ}i	v^{ʲ}id^{ʲ}+ít^{ʲ}i	str^{ʲ}iɟ+ít^{ʲ}i
Past	M sg	máza+l	xad^{ʲ}í+l	v^{ʲ}o+l	str^{ʲ}ik
	F sg	máza+la	xad^{ʲ}í+la	v^{ʲ}i+lá	str^{ʲ}íg+la
	N sg	máza+la	xad^{ʲ}í+la	v^{ʲ}i+ló	str^{ʲ}íg+la
	Pl	máza+l^{ʲ}i	xad^{ʲ}í+l^{ʲ}i	v^{ʲ}i+l^{ʲ}í	str^{ʲ}íg+l^{ʲ}i
	Pass. part.	máza+n	(r^{ʲ}iz$_{ʦ}$+ón)	v^{ʲ}id^{ʲ}+ón	str^{ʲ}íz$_{ʦ}$+in
	Act. part.	máza+fṣij	xad^{ʲ}í+fṣij	v^{ʲ}ét+ṣij	str^{ʲ}ík+ṣij
	Gerund	máza+f	xad^{ʲ}í+f	v^{ʲ}ét+ṣi	str^{ʲ}ík+ṣi
Infinitive		máza+t^{ʲ}	xad^{ʲ}í+t^{ʲ}	v^{ʲ}is^{ʲ}+t^{ʲ}í	str^{ʲ}i+tʃ^{ʲ}

97 According to the Russian Academy Grammar (Švedova (ed.) 1980: 667–668) only a few verbs in this class form the present passive participle. *Mazat'* is not among them, so I give the participle of *kolebat'* 'shake' instead.

98 Since *xodit'* is intransitive, it does not form passive participles. For completeness, the relevant forms of *vod'it'* 'lead' and *(za)rjadit'* 'load' are therefore included in the table. The past passive participle of *(za)rjadit'* is attested with both stem stress and end stress (Ožegov and Švedova 1992), but only the latter variant is given in the table.

99 As reported in the Russian Academy Grammar (Švedova (ed.) 1980: 667–668), only a few verbs in pattern C_2 have a present passive participle. Since *strič'* 'clip' is not one of them, I have included the relevant form of *vleč'* 'draw, drag' in the table.

100 Although according to the Russian Academy Grammar (Švedova (ed.) 1980: 673) verbs in this group generally do not have gerunds in the present tense subparadigm, forms like *maža* of *mazat'* 'smear' are occasionally found in texts, as testified by the following example from the Russian National Corpus (www.ruscorpora.ru):
I togda, maža perom, Abakumov zapisal v nastol'nom kalendare [. . .]. (Solzhenitsyn)
'And then, making a smear with the pen, Abakumov recorded in his desk calendar [. . .].'

101 The Russian Academy Grammar (Švedova (ed.) 1980: 673) reports that verbs in subpattern C_2 generally do not have gerunds in the present tense subparadigm,

the verbal suffix is either [i] or [e]. The verb *xodit'* 'walk' in Table 10.1 provides an illustration for the [i] suffix; as an example of pattern B in a verb with the [e] suffix, consider *videt'* 'see', which has the target of the transitive softening alternation in the 1 sg present tense [vʲíz̨+u], but not in the remaining forms in the present tense and imperative subparadigms.[102] In (1) I treat pattern C as the default, since it is attested in a heterogeneous set of verbs. To this pattern belong verbs with both the productive and non-productive suffixes [nu], as well as non-suffixed verbs with stems in obstruents (e.g. *vesti* 'lead' and *strič'* 'clip') and sonorants (e.g. *stat'* 'become'). In addition to this, as mentioned above, verbs with monosyllabic stems and the [a] suffix follow pattern C (e.g. *ždat'* 'wait'). We may furthermore assign all the verbs with C-final verbal suffixes to pattern C, although the only such consonant here is [j], which is not affected by the softening alternation. Recall, however, from section 9.1 that the vacuous pattern whereby [j] "alternates" with itself can be analyzed as an instance of the plain softening alternation.

The simple generalizations in (1) indicate that the shape of the stem is an important conditioning factor for the softening alternation. However, the ending is also relevant. As can be seen from Table 10.1, the targets of the alternation do not occur in all the forms of the paradigm, so in order to give a complete analysis of the softening alternation, we must characterize the endings that co-occur with the target of the alternation. Pattern A is the least challenging in this respect, since the target is found throughout the present tense and imperative subparadigms. As argued in chapter 5, non-past meaning and V-initial endings are characteristic for these subparadigms, so I propose the following generalization:

(2) Pattern A: Transitive softening before V-initial endings with non-past meaning.

---

although there are some examples attested in real texts, e.g. *bereža* of *bereč'* 'take care of', which is included in the table. Here is an example from the Russian National Corpus (www.ruscorpora.ru):

Partizany, bereža patrony, bol'še rubili zaxvačennyx. (Solzhenitsyn)

'In order to save ammunition, the partisans axed the captives more.'

102 Verbs with stem-final [a] preceded by [tʃʲ, ʂ, z̨], e.g. *kričat'* 'shout', *slyšat'* 'hear' and *deržat'* 'hold', are often mentioned in connection with verbs with the [i] and [e] suffixes, because all these verbs belong to the second conjugation in the present tense subparadigm (cf. section 4.3). A few verbs with [j] followed by [a], e.g. *stojat'* 'stand', also are in the second conjugation. Since all these verbs have a verbal suffix consisting of a single vowel, it is reasonable to analyze them as belonging to pattern A or B. Which analysis one adopts is not of primary importance in the present context, since the verbs in question display trivial alternations whereby [tʃʲ, ʂ, z̨, j] "alternate" with themselves.

There is one complication here that deserves mention. Some verbs in pattern A lack an ending in the imperative singular (e.g. *maž'* 'smear!' in Table 10.1), and thus display softening even though there is no V-initial ending. However, since this case of opacity was explored at length in chapter 8, it will not be discussed in the following.

In pattern B, the target is attested in the 1 sg present tense, which has the ending [u]. Accordingly, I suggest the following generalization:

(3) Pattern B: Transitive softening before ending [u] signaling 1 sg non-past.

As shown in Table 10.1, pattern B verbs also have softening in the past passive participle. In the table, the relevant participle ending is given as [on], so it might be tempting to extend the generalization in (3) so as to cover all cells where the ending has a rounded vowel. However, I shall not adopt such an analysis, since the past participle ending is only rounded when it occurs in stressed syllables. In unstressed position, the ending has an unrounded vowel (schwa) according to the general rules of vowel reduction described in section 3.9. Instead of appealing to rounded vowels, I propose a purely morphological account drawing on paradigm structure. We shall return to the analysis of the past passive participle in section 10.4; until then, generalization (3) will serve as the basis for discussion.

Pattern C displays the target of the plain softening alternation in an environment that is somewhat harder to describe in simple terms. As can be seen from Table 10.1, the target occurs throughout the imperative subparadigm, as well as in most of the forms in the present tense subparadigm, but the target is not attested in the forms that have [u] in the ending. Instead of accommodating this state of affairs in one cumbersome statement, I propose the following two generalizations, where the specific (4b) overrides the more general (4a):

(4) Pattern C:
   a. Plain softening before V-initial ending with non-past meaning.
   b. No softening before [u]-initial ending with non-past meaning.

The generalizations in (4) are simplistic in two respects. First, the generalizations do not say anything about the distribution of the transitive softening alternation in subpattern C_2. We shall return to this small set of verbs in section 10.5. As a first approximation to pattern C, however, the generalizations in (4) are sufficient. The second problem with the generalizations in (4) concerns the present passive participle. Since in this form the ending begins with [o], the blocking statement in (4b) does not apply, and we expect softening. However, as can be seen from forms like [v^{j}id+ómij] of *vesti* 'lead' [vl^{j}ik+ómij] of *vleč'* 'draw, drag' in Table 10.1, this prediction is not borne out by the facts. We shall not

consider this problem here, but in section 10.4 it will be shown that the absence of softening in the present passive participle is due to a broader generalization about participles that can be accounted for by means of second-order schemas.

Before we leave the generalizations in (4), a comment on the past passive participle is required. As can be seen from Table 10.1, the target of the softening alternation is attested before a V-initial ending in the past passive participle. We shall return to this form in section 10.3, but let me point out that the occurrence of softening in the past passive participle in pattern C does not require any modifications of the analysis since it displays both properties mentioned in (4a): V-initial endings and non-past meaning. Notice, in particular, that the past passive participle denotes an event in the past as well as a resulting state in the present, as was argued in section 5.5. In other words, the meaning includes the property non-past, and the past passive participle is thus compatible with (4a).

Taken together, the generalizations in (1) through (4) show that the softening alternation is conditioned by the shape of the stem and the shape and meaning of the ending. Simply put, if you know what the stem looks like and which ending follows it, you have sufficient information to determine whether a given verb form has plain, transitive or no softening. In order to illustrate the impact of all the conditioning factors for each pattern, in (5) I combine the information about the stem from (1) with the information about the ending in (2) through (4):

(5) a. Non-past, V-initial ending, suffix: [a, o], polysyllabic stem:
transitive (pattern A)
b. Non-past, 1 singular, ending: [u], suffix: [i, e]:
transitive (pattern B)
c. Non-past, [u]-initial ending:
blocking (pattern C)
d. Non-past, V-initial ending:
plain (pattern C)

The generalizations in (5) constitute a system insofar as subset relations hold among them. The statement in (5a) delineates a subset of the verb forms in (5d); the set of forms with non-past meaning, V-initial endings, the verbal suffixes [a, o] and polysyllabic stems is properly included in the set of forms with non-past meaning and V-initial endings. In a similar fashion, the statements in (5b–d) form subsets of each other – (5b) is most specific, while (5d) is most general. Generalization (5d), which describes the least restricted set of verb forms, is the global default. Under the assumption that specific statements take precedence over general statements, (5d) is overridden by (5a) and (5c). Generalization (5c) is in turn overridden by (5b). The only case where a subset relation does *not* hold between two conflicting generalizations concerns (5a) and (5c). Verbs with non-

past meaning, V-initial ending, the suffixes [a, o] and polysyllabic stems are not a subset of verbs with non-past tense and [u]-initial endings. Nevertheless, the fact that verbs like *mazat'* display the target of the transitive softening alternation before endings in [u] (e.g. [máz̩+u]) shows that (5a) takes precedence. We shall return to this issue in section 10.2.

The four generalizations in (5) accommodate the majority of the environments that are relevant for the softening alternation. However, three sets of verb forms are not accounted for:

(6) a. The past passive participle in pattern B.
b. The present passive participle in pattern C.
c. The forms displaying the transitive softening alternation in subpattern C_2.

In sections 10.3 and 10.4 I provide detailed analyses of the participles in (6a-b) in terms of second-order schemas. Subpattern C_2 will be discussed in section 10.5, which highlights the interaction between the segment inventory and the softening alternation. Before we turn to the special cases in (6), however, I will propose a Cognitive Grammar analysis of the generalizations in (5). This is the topic of section 10.2.

10.2. Opacity and the softening alternation

On the face of it, it may seem simple to advance schemas for the generalizations in (5) above. They refer to three types of information: the shape of the stem, the shape of the ending and non-past meaning. The shape of the stem and ending pertain to the phonological pole of schemas, while "non-past" is part of the semantic pole. However, one issue complicates the picture: opacity. The problem is occasioned by the fact that the verbal suffixes consisting of a vowel alternate with Ø (zero), i.e. what is referred to as the "truncation alternation" in this book. By way of example, consider the pattern A verb *mazat'* in Table 10.1. This verb contains the verbal suffix [a], which, as argued in section 10.1, is necessary for predicting the target of the softening alternation throughout the present tense and imperative subparadigms. However, the suffix only occurs in the past tense and infinitive subparadigms. No [a] is attested between the root and the inflectional ending in the present tense and imperative subparadigms, which are the forms displaying the target of the softening alternation. In a sense, therefore, the occurrence of softening seems to be conditioned by a suffix that is not present in the relevant forms. How can something that is not there condition

the softening alternation? How can we account for this state of affairs in terms of schemas?

Before we turn to Cognitive Grammar, it may be instructive to consider a rule-based approach, which shows that the problem is similar to the cases of opacity explored in chapter 8. The derivation of the 3 singular present tense form [máz̡+it] of *mazat'* 'smear' may be presented as follows: [103]

(7)	Underlying representation:	máza+ot
	Softening (z → z̡ / _ a+V)	máz̡a+ot
	Truncation (V → Ø / V _ +V)	máz̡a̶+ot
	Output:	máz̡+it

In (7) the underlying representation includes the non-palatalized consonant /z/ followed by the verbal suffix, which triggers softening throughout the present and imperative subparadigms. Softening is effected by the rule that applies first. The precise formulation of the softening rule is not relevant for the present argument; for our purposes it is sufficient to observe that the rule introduces [z̡] before the verbal suffix. In order to restrict the application of the rule to the present and imperative subparadigms, the rule specifies that a V-initial ending follow the verbal suffix. A capital V representing any vowel is included before the open space in the environment because the rule only applies to polysyllabic stems. After softening, the Jakobsonian truncation rule discussed in section 5.2 eliminates hiatus by deleting the verbal suffix. The deleted vowel is marked by double strikethrough (a̶). The interaction of the two rules is an example of counterbleeding opacity. The truncation rule *bleeds* the softening rule in that it removes the vowel suffix that is necessary for softening to apply. It *counter*bleeds softening in that it is ordered after softening and therefore does not prevent softening from applying. The result of this rule interaction is opaque overapplication – softening occurs although the derivational suffix that triggers it is not found in the relevant surface forms. In this way, the softening example in (7) resembles the imperative singular discussed in section 8.2.

In order to overcome the opacity problem in (7) I propose capitalizing on the concept of "second-order schema". As we have seen, the verbal suffix [a] that conditions the softening alternation is not attested in the present tense or imperative forms, and therefore cannot be part of schemas over these forms. However, the suffix does occur in the past tense and the infinitive. It is possible

103 In the 1960s and 1970s several rule-based analyses of softening in Russian couched in Chomsky and Halle's (1968) SPE model were published. Examples include Halle (1963) and Lightner (1967 and 1972). While the simplified derivation in (2) does not correspond exactly to any of these analyses, it is sufficiently precise to illustrate the problem under scrutiny.

for speakers of Russian to compare past tense forms like [máza+l] '(he) smeared' and [pʲisá+l] '(he) wrote' with the corresponding present tense forms [máʐ+it] '(s/he) smears' and [pʲíʂ+it] '(s/he) writes'. Since the past and present tense forms of each verb are similar, but not identical, such a comparison would involve establishing an extension relation between them. In the lower portion of Figure 10.1, I give a schema for the relevant forms of each verb. Each schema is represented as a box. The boxes for the past and present tense forms of each verb are connected by means of extension relations represented as dashed arrows. Since it is possible that such comparisons can be carried out repeatedly and in a systematic fashion, the language users may establish schemas over the extension relations, i.e. what I refer to as "second-order schemas" in this book. As usual, I represent the second-order schemas as boxes including the first-order schemas for the past and present tense forms as well as the extension relation connecting them.

The two second-order schemas in the lower portion of Figure 10.1 are related through a more general schema, which they both instantiate. The upper box of the topmost schema represents the past tense forms. In the same way as in chapter 5, I represent past tense meaning by means of the formula E < S, stating that an event (E) takes place before the moment of speech (S). The phonological pole of the schema states that the past tense has a stem consisting of a consonant and the verbal suffix [a] followed by a C-initial ending. In addition to the [a] suffix, the stem contains another vowel represented as a capital V; in this way we make sure that the schema covers polysyllabic stems only.[104] The lower part of the topmost schema represents the present tense and imperative forms where the target of transitive softening is attested. These forms have non-past meaning, represented by the formula E ≥ S, and V-initial endings. Since the [a] suffix does not occur in the present tense and imperative subparadigms, there is no verbal suffix in the schema for these subparadigms. Instead, the V-initial ending is preceded by a consonant with the properties "alveopalatal" and "continuant". Recall from sections 9.2–9.3 that these properties are characteristic for the target of the transitive softening alternation. The suspension points before "continuant" represents the fact that this feature refers to the right edge of the target segment. As shown in section 9.3, the target may be an affricate, i.e. a complex segment

104 The distinction between monosyllabic and polysyllabic stems refers to the past tense forms, because some of the verbs in question exhibit so-called mobile vowels in the present tense and imperative subparadigms. Compare *brat'* 'take' and *mazat'* 'smear'. In the past tense subparadigm, *brat'* has a monosyllabic stem (cf. *bral* 'he took'), while the stem of *mazat'* contains two syllables (cf. *mazal* 'he smeared'). In the present tense and imperative subparadigms, on the other hand, both verbs have monosyllabic stems, as shown by forms like *mažu* 'I smear' and *beru* 'I take'.

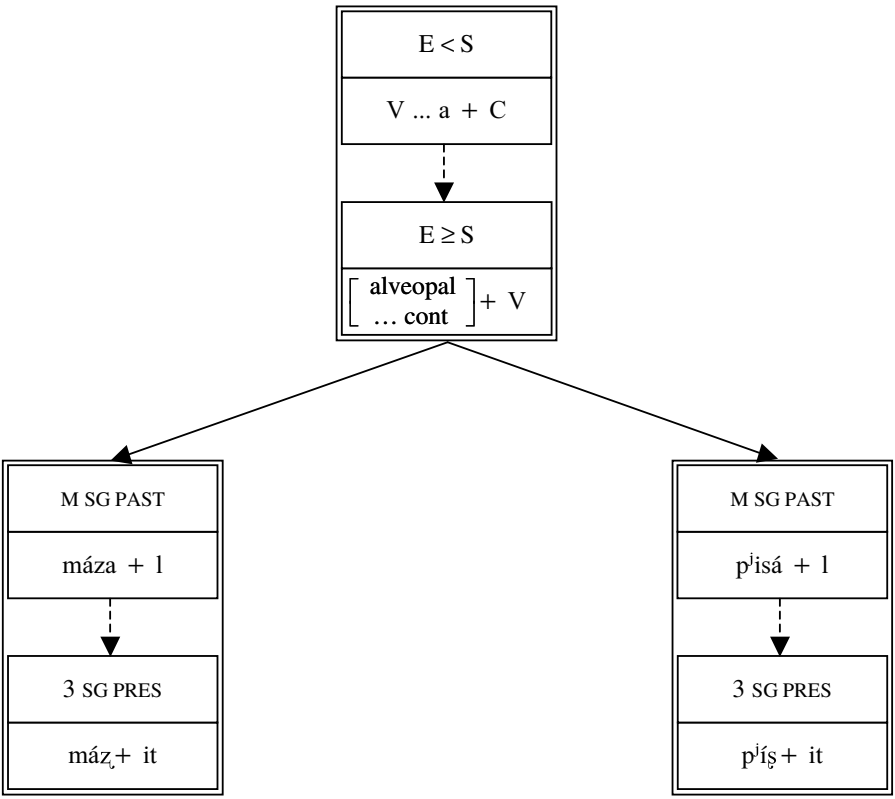

Figure 10.1. Opacity as second-order schemas

having a complete closure at its left edge, but a fricative (a continuant) at its right edge.

What the topmost schema in Figure 10.1 says is that verbs with polysyllabic stems and the [a] suffix immediately before the inflectional ending in the past tense have the target of the transitive softening alternation in the non-past (i.e. the imperative and the present tense) forms. This is exactly the generalization we want to make; it connects the transitive softening alternation to polysyllabic stems with the [a] suffix and V-initial endings in the present tense and imperative subparadigms. On this basis, I conclude that the opacity problem in verbs of this sort can be solved in Cognitive Grammar by means of second-order schemas. The analysis lends further support to the morphological approach to phonological opacity explored in chapter 8. In the same way as for the imperative, I analyze

opacity in terms of schemas for morphological forms and relations connecting the forms in the inflectional paradigm.[105]

We now turn to pattern B. Recall from (1b) above that this pattern encompasses verbs with the suffixes [i] and [e], and that it has the target of transitive softening before the ending [u]. Pattern B verbs involve the same opacity problem as the verbs with the [a] suffix; although the suffix is necessary for predicting the distribution of the softening alternation, there is no verbal suffix in the forms containing the target of the softening alternation. I propose solving the opacity problem by means of the second-order schema to the left in Figure 10.2. The upper box, which represents the past tense, contains a suffix consisting of a front vowel. The lower box clarifies that the verbs in question display the target of the transitive softening alternation before the ending [u], which signals non-past tense as well as first person singular.

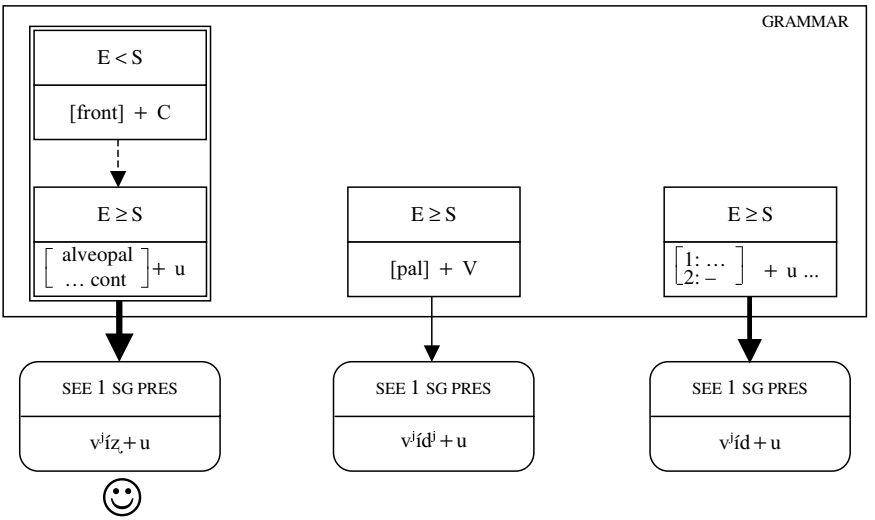

Figure 10.2. Schema interaction and the softening alternation in pattern B

The schema for pattern B interacts with a schema for pattern C, given in the middle in Figure 10.2. Recall from the previous section that I analyze pattern C as the default pattern, whereby the target of the plain softening alternation occurs in the paradigm cells with V-initial endings and non-past tense. As the

105 In the previous section, I mentioned that verbs with the suffix [o] (e.g. *kolot'* 'stab') follow pattern A in the same way as verbs with the [a] suffix. However, I shall not discuss the question as to whether and how the network in Figure 10.1 can be extended so as to accommodate the small group of verbs with the [o] suffix, since this question does not bear on the main topic of this section, viz. opacity.

default, pattern C is not restricted to any particular verbal suffixes, but applies to all verbs not covered by patterns A or B. It is therefore not necessary to refer to the past tense forms for pattern C. Hence, pattern C is represented by a first-order schema in Figure 10.2, which refers to the present tense and imperative forms with V-initial endings. The schema contains the feature [pal(atal)], which was shown in section 9.1 to be characteristic for the target of the plain softening alternation, either as the primary or the secondary place of articulation.

As pointed out in section 10.1, verbs of pattern C do not have soft segments before endings in [u]. In order to capture this generalization, I propose the schema to the right in Figure 10.2. In pattern C verbs, the following classes of segments are attested before the endings in [u]: plain labial and alveolar consonants (cf. [gr^{j}ib+ú] '(I) row' and [n^{j}is+ú] '(I) carry'), as well as the velar plosives [k, g] (cf. [p^{j}ik+ú] '(I) bake' and [str^{j}ig+ú] '(I) clip') and the palatal sonorant [j] (cf. [igráj+u] '(I) play'). This is a heterogeneous set of segments, so it is likely that language users represent them by more than one schema constituting a structured network. Notice, however, that all the segments in question have a primary place of articulation, but no secondary place. In the schema I specify this by means of suspension points in the slot for the primary place and a dash in the slot for the secondary place. To the extent that this schema blocks the occurrence of palatalized labial and alveolar consonants in the [u]-initial forms, it captures the generalization in (4b) in section 10.1 that the plain softening alternation is blocked in the cells with [u]-initial ending. Bear in mind, however, that the schema to the right in Figure 10.2 is only the topmost schema in a structured network of schemas. The schema is too general to exclude the palatal plosives [c, ɟ]. In order to account for the fact that velar, but not palatal plosives are attested before [u]-initial endings, it is necessary to invoke one of the more specific schemas in the network. For the purposes of Figure 10.2, however, the rightmost schema is precise enough.

Figure 10.2 contains three candidates for the 1 singular present tense of *videt'* 'see', which illustrate the interaction of the schemas. The transitive softening alternation is represented in the candidate to the left, which contains the segment [z̪]. This candidate is an instantiation of the second-order schema for pattern B to the left in the grammar fragment. The palatalized [d^{j}] in the middle candidate is the target of the plain softening alternation. This candidate therefore overlaps with the middle schema in the grammar, which stands for pattern C. The rightmost candidate does not involve softening at all, as witnessed by the non-palatalized [d] in stem-final position. This candidate instantiates the blocking schema to the right in the grammar fragment. As indicated by the thickness of the instantiation arrows, the leftmost candidate overlaps with the most specific schema in the grammar, which contains information not only about the present

tense and imperative subparadigms, but also about the shape of the stem in the past tense. The leftmost candidate is therefore correctly selected as the winner.

In Figure 10.2, subset relations hold between the classes of verbs covered by the competing schemas. The schema to the left delineates the set of verb forms with a verbal suffix consisting of a front vowel, non-past meaning and the ending [u]. These forms constitute a subset of the verb forms with non-past meaning and [u]-initial endings referred to in the rightmost schema. This set, in turn, is properly included in the set of verbs in the middle schema, which refers to forms with V-initial endings and non-past meaning.

In Figure 10.3, we turn to a somewhat more complex example of schema interaction, insofar as subset relations do *not* hold between all the competing schemas. The figure concerns the 1 singular present tense of *mazat'* 'smear', for which three candidates are provided. In the same way as in the previous figure, there is one candidate representing the transitive softening alternation (left), one for the plain softening alternation (middle), as well as one candidate with no softening (right). Since *mazat'* has the verbal suffix [a], the schema for the transitive softening alternation that is relevant here is the topmost schema from Figure 10.1. This schema is given to the left in Figure 10.3. The other two schemas in Figure 10.3 are the same as in Figure 10.2.

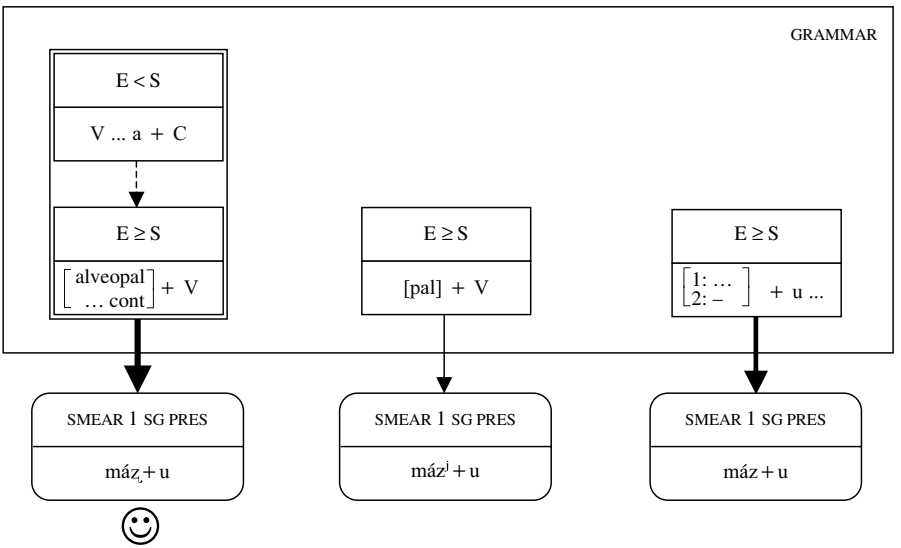

Figure 10.3. Schema interaction and the softening alternation in pattern A

As mentioned above, a subset relation holds between the two schemas to the right in the grammar fragment. The rightmost candidate instantiates the more

specific schema, and therefore shows a higher degree of conceptual overlap with the grammar than the competing candidate in the middle. However, what about the leftmost candidate, which overlaps with the second-order schema that represents pattern A? This schema does not refer to a subset of the verb forms relevant for the rightmost schema. Admittedly, the leftmost schema gives a more specific description of the stem insofar as this schema mentions the [a] suffix and the number of syllables in the stem. However, with regard to the ending, the rightmost schema is more specific, since it refers to endings in [u], while the leftmost schema is relevant for any V-initial ending. What is the prediction of the principle of conceptual overlap in situations like this? I propose that the leftmost schema takes precedence. Not only does this schema offer a detailed description of the stems in question, as a second-order schema it also provides information about the relations holding between the forms in the inflectional paradigm. On this basis, I mark the leftmost candidate as the winner in Figure 10.3.

The schema interaction in Figure 10.3 raises an important theoretical question: How do we quantify conceptual overlap between candidates and schemas in the grammar? In cases where subset relations hold between the relevant schemas, this problem does not arise. No matter how one counts the features in the schemas, a schema referring to a subset will always take precedence over a schema for a superset. In order to shed light on the question concerning the quantification of conceptual overlap, therefore, we need examples of the type given in Figure 10.3. Unfortunately, however, this is the only example of the relevant type in this book, and my analysis of the softening and truncation alternations in Russian verbs therefore does not enable us to draw any conclusions. The question must therefore be left open for future research. What the discussion in this section does enable us to draw conclusions about, is how phonological opacity can be treated in Cognitive Grammar. Insofar as the analysis I have outlined draws on second-order schemas representing the relationships between forms within the inflectional paradigm, it lends support to the morphological approach to opacity developed in this book.

10.3. Non-modularity and paradigm structure – the past passive participle

The analysis developed in the previous section enables us to account for the transitive softening alternation in the 1 singular present tense in pattern B. However, as mentioned in section 10.1, the target is also attested in the past passive participle. For instance, *srazit'* 'slay' has [z̨] not only in the 1 singular present tense [sraz̨+ú], but also in the past passive participle [sraz̨+ón]. How can we accom-

modate the past passive participle? In the following we shall see that an analysis in terms of second-order schemas is possible. The analysis is morphological in nature insofar as the second-order schema in question represents a basic-derived relation (a paradigm structure condition) connecting two forms in the paradigm, thus providing support for the idea that inflectional paradigms are structured networks of interrelated forms (cf. section 4.2). The analysis furthermore illustrates the advantages of a non-modular approach to grammar, since schemas for paradigm structure interact directly with the softening alternation.

In order to account for the fact that verbs like *srazit'* 'slay' show the target of the transitive softening alternation not only in the 1 singular present tense ([sraz̨+ú]), but also in the past passive participle ([sraz̨+ón]), I propose taking advantage of the following generalization:

(8) If a verb has the target of the transitive softening alternation in the 1 singular present tense and the past passive participle has a V-initial ending, then the target of the transitive softening alternation is found in the past passive participle.

What (8) says is that there is a correlation between the occurrence of the target of the transitive softening alternation in the 1 singular present tense and the occurrence of the target in the past passive participle.[106] In other words, we are dealing with a relationship between the forms in a paradigm of the type Bybee (1985) calls "basic-derived relations" and Wurzel (1984, 1989) refers to as "paradigm structure conditions" (cf. section 4.2). It is worth pointing out that the relationship in (8) assigns a property to a non-finite form on the basis of a finite form. In the Russian verb paradigm, there are several relations of this type taking a finite present tense form as its starting point. In section 4.2, I discussed

106 Three special cases deserve mention. First, some verbs, e.g. *čadit'* 'smoke', are reported not to have a 1 singular present tense form at all (Švedova (ed.) 1980: 660). Clearly, for such verbs the formation of the past passive participle cannot be based on the non-existing 1 singular present tense. The second group comprises verbs like *(voz)budit'* 'excite' that display [z̨] as the target of the softening alternation in the 1 singular present tense, but [z̨d] in the past passive participle (Švedova (ed.) 1980: 677). A third group of verbs is reported to lack the target of the transitive softening alternation in the past passive participle, although the 1 singular present tense has the expected target of the alternation. An example is *(za)klejmit'* 'brand', which has the expected [ml^{j}] in the 1 singular present tense, but [m^{j}] in the past passive participle (Švedova (ed.) 1980: 670). The subregularities regarding these three groups of verbs will not be discussed in the following. In view of the fact that they concern small classes of verbs, many of which are stylistically marked and/or of low frequency, the verbs in question do not jeopardize the generalization in (8), which covers the vast majority of verbs with the productive verbal suffix [i] and the non-productive [e].

an example concerning the endings in the 3 plural present tense and the present active participle. We return to a discussion of the relationship between the 3 plural present tense and the present tense participles in the following section. In the area of stress placement, the generalizations in (9) can be stated. In each statement, the form to the left of the arrow provides the basis for predicting the stress in the form following the arrow. The generalizations are illustrated by *ljubit'* 'love'. The stressed vowels are given in boldface. The first form on each line is the 1 singular present tense *ljublj**ú***. The 2 singular present tense *lj**ú**biš'* represents the remaining finite forms in the present tense paradigm, while the third form is the target of the prediction in each case.

(9)

a.	1 sg present	→	imperative:	*ljublj**ú** – lj**ú**biš' – ljub**í***
b.	1 sg present	→	gerund:	*ljublj**ú** – lj**ú**biš' – ljubj**á***
c.	1 sg present	→	present passive participle	*ljublj**ú** – lj**ú**biš' – ljub**í**myj*
d.	other present	→	past passive participle	*ljublj**ú** – lj**ú**biš' – (raz)lj**ú**blen*
e.	other present	→	present active participle	*ljublj**ú** – lj**ú**biš' – lj**ú**bjaščij*

The statements in (9) provide support for the generalization in (8), insofar as they show that (8) is part of a larger pattern of basic-derived relations.

The question now arises as to whether and how the generalization in (8) can be represented in Cognitive Grammar. In section 4.2, I suggested representing basic-derived relations (paradigm structure conditions) as second-order schemas, and earlier in this book we have considered several cases where second-order schemas connect related forms in the inflectional paradigm, including the analysis of the infinitive (cf. section 6.3), the past tense (cf. section 7.5), and the imperative (cf. section 8.3). I propose adopting the same strategy for the past passive participle too, as can be seen from Figure 10.4. This schema connects the 1 singular present tense with the past passive participle. The upper box represents the 1 singular present tense form, which in addition to the properties "first person" and "singular" has non-past meaning represented in the formula E ≥ S. As for form, the upper box contains the features [continuant] and [alveo-palatal] that characterizes the target of the transitive softening alternation, as well as the ending [u]. The past passive participle, represented in the lower box in the schema, displays the target of the transitive softening alternation followed by a V-initial ending. For simplicity, the meaning of the past passive participle is given as "PPP"; a more accurate representation of the meaning is irrelevant in the present context. The dashed correspondence line between the targets of the softening alternation in the two forms makes sure that the forms display

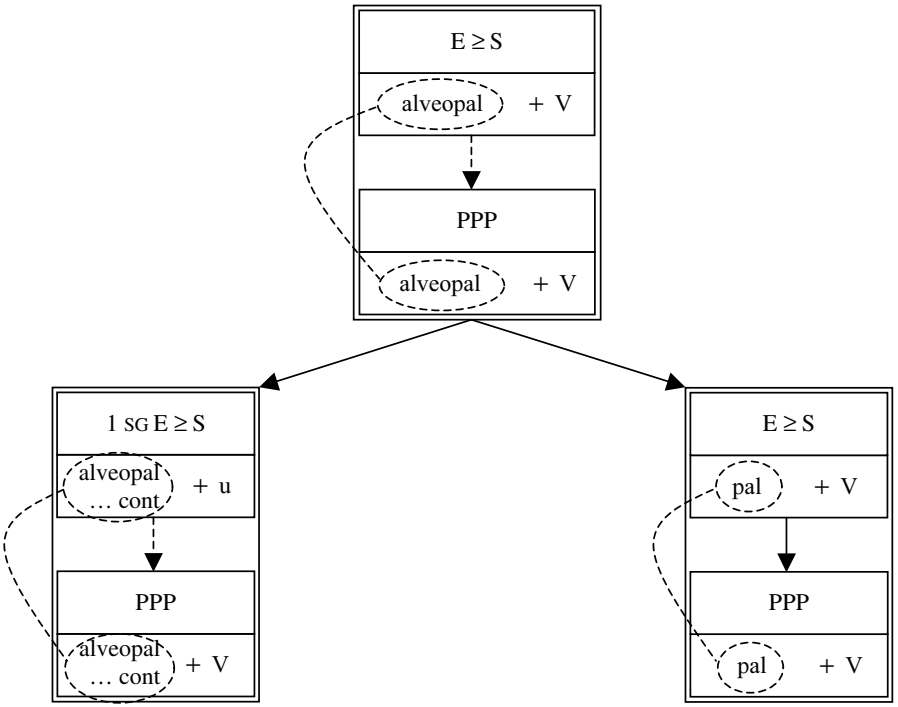

Figure 10.4. A structured network for the softening alternation in the past passive participle

the same segment in stem-final position. In this way we exclude the theoretical possibility that a verb can have, say, [plʲ] in the 1 singular present tense, and [tʃʲ] in the past passive participle.[107]

The generalization in (8) is part of a larger picture. As mentioned in section 10.1, the target of the softening alternation in the past passive participle is not limited to pattern B. Past passive participles with a V-initial ending are attested in pattern C too, as witnessed by forms like [uvʲidʲ+ón] of *uvesti* 'take away'. There are two differences between patterns B and C. First, while verbs in pattern B have the transitive softening alternation, forms like [uvʲidʲ+ón] in

107 By removing the correspondence line in the schema in Figure 10.4, we would be able to account for the small group of exceptional verbs like *(voz)budit'* 'excite' that have [z] in the 1 singular present tense, but [zd] in the past passive participle. However, I shall not pursue this issue here, since verbs of the *(voz)budit'* type do not bear on the theoretical discussion of paradigm structure.

pattern C involve the plain softening alternation.[108] Secondly, the occurrence of the soft stem-final consonant in [uvʲidʲ+ón] cannot be related to the 1 singular present tense, since in pattern C the softening alternation is blocked in this form. Recall from sections 10.1 and 10.2 that in pattern C the target of the softening alternation represents the default in the present tense and imperative subparadigms, but that the alternation is blocked before endings in [u]. In pattern C, therefore, the occurrence of a soft consonant in the past passive participle must be related to the default schema, not the schema for the 1 singular present tense. The second-order schema to the right in the lower portion of Figure 10.4 accounts for the softening alternation in the past passive participles in pattern C. The upper part of the schema represents the default, where the target of the plain softening alternation is found in paradigm cells with a V-initial ending and non-past meaning. The target of the plain softening alternation is represented by means of the feature [palatal]. The lower part of the schema assigns the same feature to the stem-final consonant before a V-initial ending in the past passive participle. The dashed correspondence line between the two parts of the second-order schema makes explicit the fact that the past passive participle has exactly the same stem-final consonant as the forms covered by the upper part of the schema.

In section 5.5, I pointed out that the meaning of the past passive participle combines reference to an event in the past with a resulting state in the present. In this way, past passive participles involve both past and non-past time reference at the same time. Since past passive participles like [uvʲidʲ+ón] have non-past meaning and a V-initial ending, they are fully compatible with the default schema that assigns the target of the softening alternation to forms with these characteristics. In the second-order schema to the right in Figure 10.4, the full compatibility is captured by means of the solid instantiation arrow connecting the two parts of the schema. Notice that since the past passive participle is fully compatible with the default schema, and hence the softening alternation in the past passive participle is covered by the default schema, one could object that it is not necessary to include a separate second-order schema for the past passive participles in pattern C. However, while it is true that the rightmost schema in Figure 10.4 introduces some redundancy in the grammar, I would like to remind the reader that this is not necessarily a bad thing. As mentioned in section 3.3, it is well known from psycholinguistic studies that speakers tolerate a certain amount of redundancy in their mental grammars. The reason why

108 In subpattern C_2, the transitive softening alternation occurs, as shown by forms like [ispʲitʃʲ+ón] 'baked'. I shall not discuss subpattern C_2 here, but a detailed analysis of the motivation for the transitive softening alternation in these verbs will be provided in section 10.5 below.

I have included the schema for the past passive participles in pattern C in my analysis is that this schema shows that generalization (8) above is an instance of a broader generalization:

(10) If a verb has the target of the softening alternation in part of the present tense and imperative subparadigms and the past passive participle has a V-initial ending, then the target of the softening alternation is found in the past passive participle.

The generalization in (10) is captured in the topmost schema in Figure 10.4. The stem-final consonant in this schema carries the feature [alveo-palatal]. Since I use this feature as a cover term for palatal and post-alveolar consonants, it covers the targets of both the transitive and plain softening alternation. The feature [continuant] is not included in the topmost schema, however, because the plain softening alternation allows plosives as targets, as illustrated by forms like [uvʲidʲ+ón]. The upper part of the topmost schema relates the occurrence of the alveo-palatal consonant to non-past meaning and a V-initial ending, while the lower part states that the same consonant is attested in past passive participles with V-initial endings.

The discussion of the past passive participle has implications for linguistic theory. In section 4.2, I argued that inflectional paradigms are not unordered lists, but rather structured networks of related forms. I showed that the conception of paradigms as structured networks falls out as an automatic consequence of Cognitive Grammar, where all categories are modeled as networks of schemas connected by means of categorizing relationships. The analysis I have advanced in this section supports the conception of paradigms as structured networks, since a basic-derived relation (paradigm structure condition) is pivotal in the proposed account of the past passive participle.

The past passive participle furthermore bears on an important issue in linguistic theory and cognitive science: modularity. Is there an autonomous language faculty in the human mind? Do phonology, morphology, syntax and semantics constitute largely independent components ("modules") with very limited interaction? As pointed out in section 2.1, Cognitive Grammar is a non-modular framework. Language is considered an integrated part of cognition, and phonological, morphological, syntactic and semantic phenomena are all analyzed by means of schemas and categorizing relationships that interact directly in category networks. There are arguments from neuroscience for a non-modular approach to grammar. For example, Feldman (2006: 8–9) refers to the division of grammar into autonomous modules like phonology, morphology, syntax and semantics as "artificial", and states that it "makes no biological sense to talk about an autonomous module for grammar or any other capability" (Feldman

2006: 282). An assessment of Feldman's argument is beyond the scope of this book. However, the Russian softening alternation illustrates the practical advantages of a non-modular framework for the working grammarian. We have just seen that the structure of the inflectional paradigm has a direct impact on the softening alternation. Cognitive Grammar provides a straightforward account of this interaction with morphology, since all linguistic phenomena are analyzed as networks of schemas connected by categorizing relationships. This conclusion will be reinforced in the following sections where we consider another example illustrating the relevance of paradigm structure (section 10.4), before we turn to the impact of the Russian inventory of phonological segments in section 10.5.

10.4. Non-modularity and paradigm structure – the present tense participles

The present passive participle requires special attention in verbs of pattern C. As I pointed out in section 10.1, these verbs display the target of the plain softening alternation in the majority of the forms in the present tense subparadigm, including the forms that have [o] in the ending. By way of example, consider the 1 plural present tense of *vesti* 'lead', [v^{j}id^{j}+óm], which has palatalized [d^{j}] in stem-final position. In the analysis developed in section 10.2, the default schema assigns the target of the plain softening alternation throughout the present tense and imperative subparadigms of pattern C verbs. On this basis, we would expect the target of the plain softening alternation in the present passive participle in pattern C, but this prediction is not borne out by the facts; pattern C verbs have a hard consonant in stem final position in the present passive participle, as shown by [v^{j}id+ómij] from *vesti* 'lead'.[109] It may be worth mentioning that this is a systematic property of verbs of pattern C. Even though far from all these verbs have a present passive participle, those that do, consistently have a hard consonant in stem-final position. In section 10.2 I defined a schema that blocks the softening alternation before [u]-initial endings in pattern C, but this schema does not cover the present passive participle, which has [o] in the ending. It would not be possible to extend the blocking schema to all rounded vowels, because then we would incorrectly predict hard stem-final consonants in the present tense forms like [v^{j}id^{j}+óm]. Instead, I propose a morphological account

109 In [v^{j}id+ómij], [om] is the present passive participle ending, while [ij] is an agreement marker of masculine, singular and nominative. In the following we will only be concerned with masculine singular nominative forms of the present participles.

Table 10.2. The 3 plural present tense and the present active and passive particples

	Pattern A:	Pattern B:	Pattern C_1:	Pattern C_2:
3 pl present	kalʲéblʲ+ut	vódʲ+at	vʲid+út	vlʲik+út
Pass. part.	kalʲéblʲ+imij	vadʲ+ímij	vʲid+ómij	vlʲik+ómij
Act. part.	kalʲéblʲ+uʃʲːij	vódʲ+aʃʲːij	vʲid+úʃʲːij	vlʲik+úʃʲːij
Gloss:	'shake'	'lead'[110]	'lead'	'draw, drag'

of the participles in question, drawing on the relations holding between forms in the inflectional paradigm.

Let us consider the relationship between the present tense participles and the 3 plural present tense. Table 10.2 contains four verbs representing patterns A, B, C_1 and C_2. As can be seen from the table, verbs in pattern C (both C_1 and C_2) have the same stem-final consonant in both the present passive participle and the 3 plural present tense. However, I propose extending the scope of this generalization in two ways. First, the correlation between the stem-final consonant in the present passive participle and the 3 plural present tense is not restricted to pattern C. As shown in Table 10.2, verbs of pattern A have the target of the transitive softening alternation in both forms, while pattern B verbs have a palatalized consonant. Secondly, the scope of the generalization can be extended so as to cover the present *active* participle as well; as indicated in the table, the stem-final consonant of the present *active* participle is also always identical to the corresponding consonant in the 3 plural present tense. We can therefore state the following descriptive generalization:

(11) Present tense participles have the same stem as the 3 plural present tense form.

Notice that the generalization in (11) is of the same type as the generalizations discussed in the previous section, insofar as a property of a non-finite form is predicted on the basis of a finite form in the present tense subparadigm. In this way, (11) complies with the structure of the Russian verb paradigm. Further support for (11) comes from the shape of the endings in the 3 plural present tense and the present active participle. As pointed out in section 4.2, the ending in the present active participle begins in the same vowel as the ending of the

110 Notice that both *vesti* and *vodit'* are glossed 'lead'. However, *vesti* is a so-called unidirectional verb, while the other has so-called non-directional meaning. I give an analysis of the relationship between the unidirectional and non-directional verbs of motion in Nesset (2000).

3 plural present tense. In view of this correlation, it is not surprising that the present active participle and the 3 plural present tense have identical stems too.

The challenge is now to accommodate the generalization in (11) in Cognitive Grammar. Consider Figure 10.6, which contains four second-order schemas. They are of the same type discussed in the previous section, insofar as they capture the relationships between morphological forms in the paradigm. The upper box in each schema refers to the 3 plural present tense, while the lower box covers the present active and passive participles. The schemas in the lower portion of the figure represent patterns A to C. The leftmost schema depicts a situation where the forms in question have the target of the transitive softening alternation in stem-final position. As shown in Table 10.5, this situation is characteristic of pattern A (cf. *kolebat'* 'shake'). Notice that I use the features [continuant] and [alveo-palatal] in order to describe the target of the transitive softening alternation. The dashed correspondence lines make explicit that the stem final consonant in the two parts of the schema is the same. In the middle schema in the lower portion of Figure 10.6, the stem-final consonant in the rele-

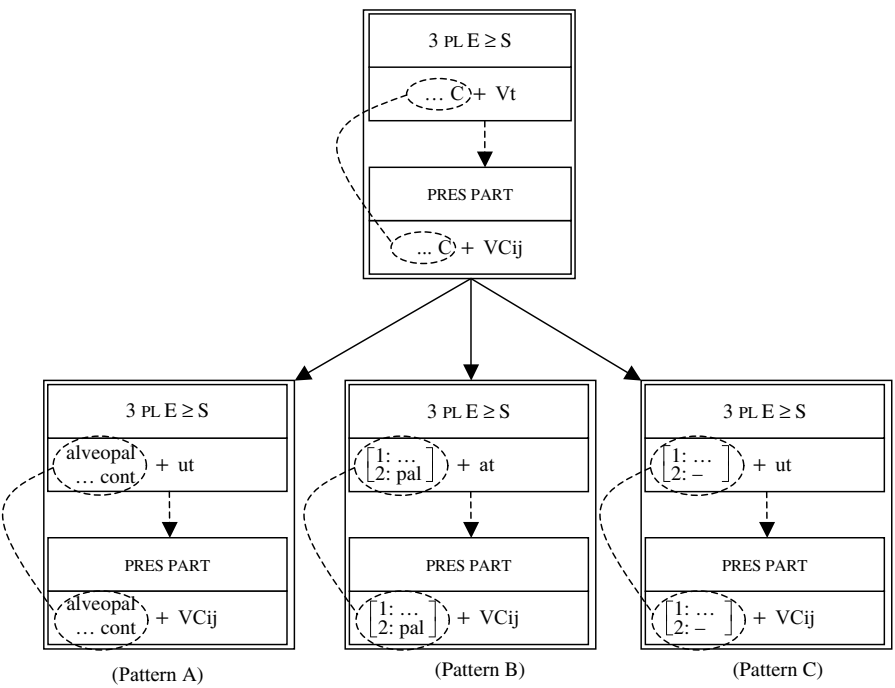

Figure 10.5. Structured network for present tense participles

vant forms is palatalized, i.e. it has a palatal secondary place of articulation. As we have seen, this is characteristic for pattern B (e.g. *vodit'* 'lead' in Table 10.2). In pattern C, the stem-final consonant may be a non-palatalized labial or alveolar (cf. [v^{j}id+út] of *vesti*) or a velar plosive (cf. [vl^{j}ik+út] of *vleč'*). In addition, we must consider verbs with stem-final [j] (cf. [igráj+ut] of *igrat'* 'play'), since in section 10.1 I argued that these verbs belong to pattern C. The attested stem-final consonants in pattern C verbs do not have much in common, but as pointed out in section 10.2, they all lack a secondary place of articulation. The rightmost schema in Figure 10.6 represents this state of affairs. The schema in the upper portion of the figure does not specify any features for the stem-final consonant, but the dashed correspondence line shows that the present tense participles have the same consonant as the 3 plural present tense. In this way, Cognitive Grammar facilitates an adequate account of the generalization in (11).

Three conclusions can be drawn from the discussion of the present tense participles. First of all, it has been shown that second-order schemas enable us to account for the stem-final consonant in these forms. Second, as in the previous section, the proposed analysis provides support for the idea that inflectional paradigms are structured category networks, insofar as relations between the forms in the paradigm constitute the basis for the analysis. Third, the section has provided further evidence in favor of a non-modular approach to grammar, since we have seen that morphological schemas interact directly with the softening alternation.

10.5. Non-modularity and segment inventory

The discussion so far has highlighted the role of morphology as a conditioning factor for the softening alternation in Russian verbs. However, we have not considered verbs of pattern C_2, e.g. *strič'* 'clip'. In the following, I shall outline an analysis based on schemas for phonemes and allophones that grants a role for phonology proper in the analysis of the environment triggering the softening alternation. As we shall see, this interplay between the segment inventory and the softening alternation can be accommodated in Cognitive Grammar, which does not locate syntax, morphology and phonology in different modules, but rather allows schemas from different domains to interact directly.

Recall from section 10.1 that pattern C_2 has the target of the softening alternation in the same forms as pattern C_1, but that C_2 is more complex in that it shows both the plain and the transitive varieties of the softening alternation. In pattern C_2, the plain alternation occurs in the imperative, while the transitive alternation is found in the present tense forms where the inflectional ending be-

gins with [o], as well as in the gerund with the ending [a]. Admittedly, verbs of pattern C_2 normally do not have gerunds, but forms with the transitive softening alternation are attested for some verbs, e.g. *žeč'* 'burn' and *bereč'* 'take care of' (Švedova (ed.) 1980: 672). The present passive participle lacks softening for the reasons discussed in the previous section and will not be treated in the following. It should be noted that the distribution of plain and transitive softening described here is characteristic of a somewhat conservative variety of standard Russian. We shall return to differences in dialects and more innovative varieties of the standard language below.

Pattern C_2 is attested in verbs with a root-final velar plosive. Most of the verbs in question are non-suffixed verbs, but the pattern also occurs in *lgat'* 'lie', which has the verbal suffix [a] and a monosyllabic stem. A full list of the relevant non-suffixed verbs is given in section 6.1. Pattern C_2 is not productive, but includes some fairly frequent verbs that belong to the core vocabulary.

How is the segment inventory relevant for verbs of pattern C_2? In order to see this, recall from section 3.2 that while most targets of the plain softening alternation (e.g. /t^{j}, d^{j}, s^{j}, z^{j}/) have phoneme status, this is not true of the palatal obstruents [c, ɟ, ç]. At least in the somewhat archaic variety of Standard Russian we are considering here, palatal and velar obstruents are in complementary distribution, insofar as [c, ɟ, ç] are attested before [i, e, j], while [k, g, x] occur elsewhere. As shown in Table 10.1, verbs of pattern C_1 only have the plain softening alternation, and a priori we would expect this to be the case for the closely related pattern C_2 too. However, this would yield palatal obstruents before endings beginning with [o, a], i.e. phonologically impermissible strings like *[co], *[ca], *[ɟo] and *[ɟa]. Instead, the verbs of pattern C_2 have strings consisting of the targets of transitive softening [tʃ^{j}, z$_{t}$] followed by [o, a]. Importantly, the strings [tʃ^{j}o], [tʃ^{j}a], [z$_{t}$o] and [z$_{t}$a] are unproblematic in Russian phonology, insofar as the post-alveolar obstruents occur freely before non-front vowels. What we see then, is that pattern C_2 verbs display the targets of the transitive softening alternation in exactly the cells of the paradigm where the plain softening alternation would create phonologically impermissible strings of segments. In this way, the softening alternation is dependent on the phonological system. The question is how to account for this state of affairs in Cognitive Grammar.

Let us start with the phonological schemas that bear on the issue. As in sections 3.1 and 9.3, I assume that phonemes are represented as context-free schemas. In Figure 10.6, therefore, there are context-free schemas for the phonemes /g, z$_{t}$/. The allophone [ɟ], on the other hand, is represented in a schema stating that this consonant occurs before the front segments [i, e, j]. In addition to the phonological schemas, Figure 10.6 contains two second-order schemas concerning the softening alternation. The second-order schema to the right states

that verbs with a root-final velar in the past tense subparadigm has the target of the transitive softening in the present tense subparadigm. As in chapters 6 and 7 (see especially section 6.2), I employ $]_R$ in order to indicate the right edge of the root. The target has the specifications post-alveolar, obstruent and continuant. Bear in mind from section 9.3 that the velar plosives [k, g] alternate with the affricate [tʃʲ] or the fricative [z̡]. The second-order schema to the left, which predicts plain softening in the present tense, is a variant of the general schema for pattern C introduced in section 10.2. However, the schema in Figure 10.6 is more specific in that it refers to verbs with a velar segment in root-final position in the past tense subparadigm. Whether this specific version of the schema is part of the mental grammar of the language users is an open question. However, the schema is included in Figure 10.6 in order to show that even a specific schema for plain softening is not sufficient to outbalance the competing phonological and morphological schemas.

Figure 10.6 considers three candidates for the 3 singular present tense of *strič'* 'clip' – one with stem-final [g] (left), one with [ɟ] (middle) and one with [z̡] (right). The left- and rightmost candidates receive support from the phonological first-order schemas, insofar as [go] and [z̡o] are permitted strings in Russian. The candidate in the middle, on the other hand, does not instantiate a phonological schema. Although the candidate contains [ɟ], this consonant is not followed by a front vowel, and it is therefore not compatible with the schema for [ɟ] and a front vowel. As for the second-order schemas, the candidate in the middle shows conceptual overlap with the schema for the plain softening alternation, while the rightmost candidate overlaps with the schema for the transitive softening alternation. The only candidate that instantiates two schemas is the one to the right, and this candidate is therefore correctly selected as the winner. In other words, the interaction of the first- and second-order schemas enables us to account for the occurrence of the transitive softening alternation in verbs of pattern C_2. Even if we assume a schema for plain softening that is as specific as the schema for the transitive softening alternation, the candidate with the transitive softening alternation is favored – because of the impact of the phonological schemas. This shows that it is possible to accommodate the interdependence between the softening alternation and the segment inventory in Cognitive Grammar.

Given the crucial role of the segment inventory in Figure 10.6, we must ask what happens with C_2 pattern verbs if the inventory of segments changes. In fact, the phonology of Russian *is* changing insofar as the palatal obstruents are in the process of acquiring phonemic status. As mentioned in section 3.2, Russian has borrowed numerous words with palatal obstruents before non-front vowels, e.g. *kjuvet* 'ditch' and *gjaur* 'giaour'. Combinations of palatal obstruents and

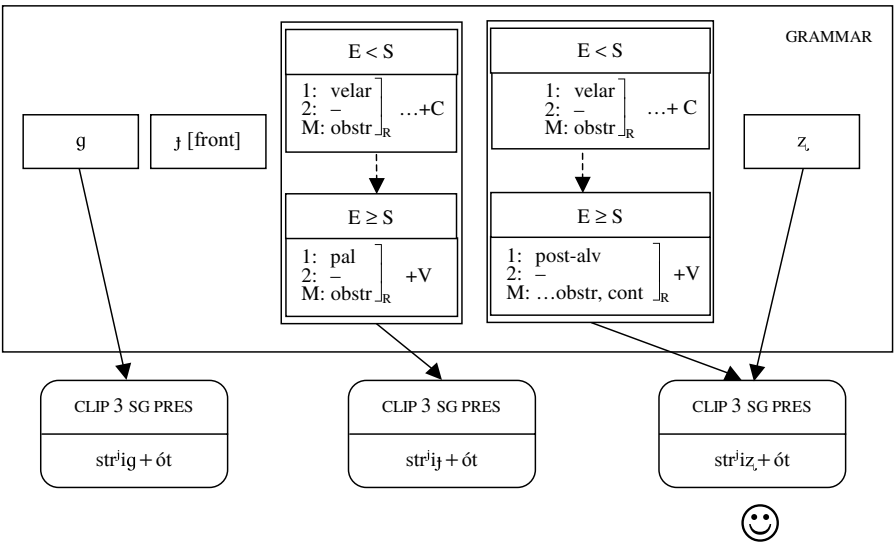

Figure 10.6. Schema interaction – allophonic palatal obstruents

non-front vowels furthermore occur as a result of the addition of productive suffixes like *–or* and *–onok* as witnessed in examples like *kiosker* 'stall-holder', *paniker* 'panic-monger' and *makakenok* 'offspring of macaque' (Flier 1982: 142, cf. section 3.2). On the basis of such examples it is possible that (some) language users consider palatal obstruents before non-front vowels permissible, and accordingly have context-free schemas for palatal obstruents in their mental grammars. How would such a grammar treat the verbs of pattern C_2? Figure 10.7 provides the answer. This figure concerns the same candidates as Figure 10.6. Furthermore, the grammar fragments in the two figures are identical with the single, but important exception that the schema for the combination [ʝ] plus a front segment has been replaced by a more general, context-free schema reflecting the phonemization of the palatal obstruents. As a consequence of this, the candidate in the middle now overlaps with two schemas in the grammar – the same number of schemas that the rightmost candidate instantiates. It is hardly the case that either candidate instantiates more specific schemas than the other, so we end up with a situation where two candidates tie. I represent this by means of two smiling faces.

In fact, Figures 10.6 and 10.7 give a simplified picture of the ongoing diachronic processes in Contemporary Standard Russian. Let me point out, however, that since we have two winning candidates in Figure 10.7, we expect vacillation. This prediction is borne out by the facts. In a large sociolinguistic investigation reported on in Krysin (ed.) (1974: 214–215), palatal obstruents

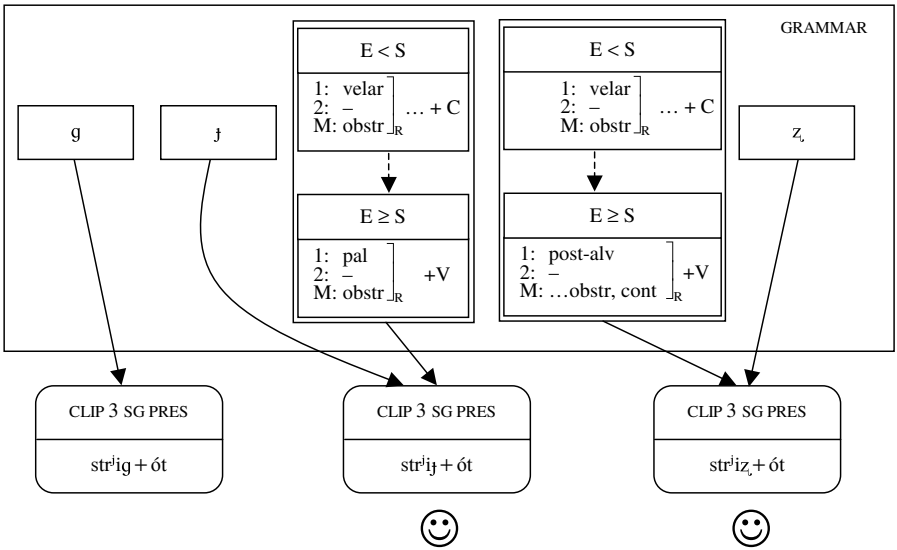

Figure 10.7. Schema interaction – phonemic palatal obstruents

were used by almost half the informants in the present tense forms of *žeč'* 'burn', while about a quarter of the speakers used palatal obstruents in the present tense of *voloč'* 'drag'. However, the transitive softening alternation is still normative in these forms; the only pattern C_2 verb where the use of palatal obstruents in the relevant present tense forms is normative is *tkat'* 'weave', cf. e.g. [tc+ot] '(s/he) weaves'. Possibly, the corroboration of the plain softening alternation in *tkat'* may have been supported by a minimality restriction on Russian verb stems. Applied to *tkat'*, the transitive softening alternation would yield the stem [tːʃʲ] or [tʃʲ]. It seems that Russian verb stems must minimally contain two different segments, e.g. [lg] in *lgu* '(I) lie'. This restriction is arguably not met in a stem consisting of only one affricate. The minimality restriction may furthermore explain why so many informants preferred forms like [ʒʝ+ot] with the plain softening alternation instead of [ʒʲːʝ+ot] with the transitive alternation for *žeč'* 'burn' in the investigation mentioned above. Be that as it may; it seems clear that the situation in present-day Russian involves variation – as predicted by the analysis presented in Figure 10.7.

While situations involving variation are often unstable, it is difficult to predict the further development, especially since it partly depends on extra-linguistic factors like social prestige. Let me, however, point out that there are language-internal factors that may support the further corroboration of the plain softening alternation in verbs of pattern C_2. First of all, this would simplify the paradigm

of C_2 verbs. After all, verbs with only the plain softening alternation are less complex than verbs with both the plain and the transitive version of the softening alternation. Second, removing the transitive softening alternation from verbs of pattern C_2 would make these verbs more similar to verbs of other patterns, especially verbs of pattern C_1, which display the plain softening alternation only. On the basis of the analysis I have outlined, it therefore does not come as a surprise that dialects with palatal obstruents in the present tense forms of pattern C_2 verbs are well attested in Russian, e.g. in most dialects of the south Russian type (cf. e.g. Požarickaja 1997: 99). Developing an analysis for the verbs in such dialects is, however, beyond the scope of this book. For our purposes it is sufficient to conclude that Cognitive Grammar facilitates an analysis of the interaction between the softening alternation and the (changing) segment inventory of Russian.

10.6. Conclusion

The account of the softening alternation I have developed in this chapter has illustrated two aspects of a cognitive approach to the interaction between phonology and morphology. First, the analysis has provided further evidence in favor of the morphological approach to opacity outlined in chapter 8. Second, this chapter has illustrated the practical advantages of a non-modular conception of grammar where morphological and phonological schemas interact directly. We have seen that the structure of inflectional paradigms has an impact on the softening alternation, and that phonological factors are relevant in that the Russian segment inventory has a bearing on the softening alternation. Beyond these two issues, the analysis I have developed indicates that Cognitive Grammar provides an insightful account of the softening alternation, which is predictable on the basis of the shape of the stem and the meaning and shape of the ending.

Chapter 11
The meaning of alternations: The truncation-softening conspiracy

Do the truncation and softening alternations have a meaning? This may be an unconventional question, but I shall argue that the answer is yes. Earlier in this book, we have seen that Cognitive Grammar facilitates insightful accounts of individual alternations. In this chapter, I show that an approach in terms of schemas and categorizing relationships also enables us to capture the interaction of alternations. This is important, it is argued, because it paves the way for an analysis of the meaning of the truncation and softening alternations. The two alternations create an opposition between the present tense and imperative subparadigms on the one hand, and the past tense and infintive subparadigms on the other. The present tense and imperative subparadigms have a consonant with the feature [alveo-palatal] in stem-final position, which I will suggest functions as marker of non-past meaning. The presence of this characteristic consonant is the result of a "conspiracy" of the truncation and softening alternations – hence the title of this chapter.

In addition to the meaning and interaction of alternations in Cognitive Grammar, this chapter bears on two theoretical issues. First, the analysis of the truncation-softening conspiracy gives us another example of a product-oriented generalization, which, as we shall see, can be captured in Cognitive Grammar by means of a first-order schema. Second, the analysis raises the issue of segmentation into morphemes. I will suggest that an adequate analysis of the truncation and softening alternations should accommodate the signifying function of strings of segments that do not constitute morphemes by traditional criteria. In this way, it will be argued, the analysis provides support for an approach in terms of schemas and categorizing relationships that downplays the role of segmentation into morphemes.

11.1. The meaning of the truncation and softening alternations

Throughout this book, I have highlighted the role of (grammatical) meaning as a conditioning factor for the truncation and softening alternations. In this chapter, I take this line of reasoning one step further and consider the form-meaning

relationship from a different perspective. Instead of asking whether the alternations are conditioned by meaning, I will investigate what meaning the targets of the alternations convey (cf. section 5.1.2). The targets convey meaning if two conditions are met. First, it must be possible to state a schema that characterizes the phonological properties shared by the targets of the alternations. Secondly, the semantic pole of this schema must not be empty. Both criteria are met for the truncation and softening alternations.

Let us consider the first criterion first. Is it possible to state a schema that covers both the truncation and softening alternations? In the analysis of the truncation alternation in chapter 5, we saw that a C-final stem followed by a V-initial ending is characteristic for the present tense and imperative subparadigms.[111] The stem-final consonant in these subparadigms is the target of the softening alternation. In the case of the plain version of the softening alternation, the stem-final consonant has the feature [palatal], which refers to the primary or secondary place of articulation (cf. section 9.1). This state of affairs is captured in the schema to the left in the lower portion of Figure 11.1, where the capital C on top of the feature matrix makes explicit the fact that the segment in question is a consonant, and not, say, a front vowel, which is also essentially a palatal segment. The schema to the right at the bottom of Figure 10.1 represents the target of the transitive softening alternation, where the relevant features of the stem-final consonant are [alveo-palatal] and [continuant] (cf. sections 9.2–9.3).

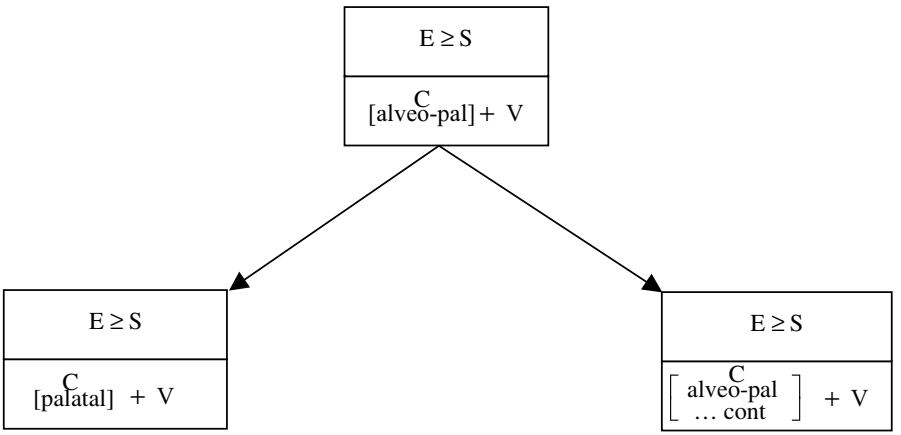

Figure 11.1. Structured network for the truncation-softening conspiracy

111 Some verbs lack an ending in the imperative, e.g. *mazat'* 'smear' and *igrat'* 'play': [maz̩] and [igráj]. However, this example of opacity will not be discussed in this chapter, because a detailed analysis was given in chapter 8.

As can be seen from the figure, the two schemas in the lower portion instantiate the more general schema at the top. The topmost schema captures the generalization that both instantiations involve a C+V pattern. Moreover, the feature [alveo-palatal] is compatible with both instantiations; recall from section 9.2 that I use [alveo-palatal] as a cover term for palatal and post-alveolar places of articulation. The topmost schema brings together both the truncation and the softening alternations. While the former contributes the C+V pattern, the latter provides a further specification of the feature content of the stem-final consonant. In view of this, it is clearly possible to state a schema that covers the targets of both the truncation and the softening alternations.

So far I have discussed only the phonological pole of the schemas in Figure 11.1. What about the meaning they convey? I propose that the meaning of the schemas is non-past, which (as in section 5.4 and elsewhere) I represent by means of the formula E $\geq$ S. The rationale behind this analysis is the fact that the truncation and softening alternations create an opposition between the present tense and imperative subparadigms on the one hand, and the past tense and infinitive subparadigms on the other. In other words, a stem-final consonant with the feature [alveo-palatal] followed by a V-initial ending is characteristic of the present tense and imperative subparadigms and serves to set these subparadigms apart from the remainder of the inflectional paradigm. In order to see that this is indeed the case, consider Table 11.1, which summarizes the situation for the verbs in softening patterns A-C discussed at length in chapter 10. The table contains representative forms for each subparadigm: 3 singular present tense, imperative singular, masculine singular past tense and infinitive. For the present tense subparadigm, the forms with [u]-initial endings behave differently in patterns B and C, so separate cells are given for these forms in the table. Verbs in the first conjugation have three forms with [u]-initial endings (1 singular, 3 plural and active participle), while second conjugation verbs have [u] only in the 1 singular. In the table, the 1 singular present tense represents the forms with [u]-initial endings. Shaded cells indicate that the shape of the stem is compatible with the topmost schema in Figure 11.1.

Verbs in pattern A display the target of the transitive softening alternation in stem final position throughout the present tense and imperative subparadigms. In the past tense and infinitive subparadigms, on the other hand, the stem ends in a vowel, as illustrated by *pisat'* 'write' in the table. In pattern B, the target of transitive softening is found only in the [u]-initial 1 singular present tense, as can be seen from Table 10.1.[112] Notice that I have shaded the cells for the remaining

112 In addition, verbs in pattern B and some verbs in pattern C display the target of the softening alternation in the past passive participle. Examples include [sraz$_{t}$+ón] and [uv^{j}id^{j}+ón] of *srazit'* 'slay' (pattern B) and *uvesti* 'take away' (pattern C). On

Table 11.1. The opposition between the present/imperative and past/infinitive subparadigms

		A:	B:	C ([j]-final):	C (other):
Present	_ [u] (1 sg)	pʲiʂ+ú	xazˌ+ú	igráj+u	maxn+ú
	elsewhere (3 sg)	pʲíʂ+it	xódʲ+it	igráj+it	maxnʲ+ót
Imperative	2 sg	pʲiʂ+í	xadʲ+í	igráj	maxnʲ+í
Past	M sg	pʲisá+l	xadʲí+l	igrá+l	maxnú+l
Infinitive		pʲisá+tʲ	xadʲí+tʲ	igrá+tʲ	maxnú+tʲ
Gloss		'write'	'walk'	'play'	'wave'

forms in the present tense and imperative subparadigms too. In these forms the stem ends in a consonant with an alveo-palatal primary or secondary place of articulation. The consonant in question (the palatalized [dʲ] in *xodit'* in the table) is attested in all forms of the paradigm, but it is only in the present tense and imperative subparadigms that it occurs in stem-final position. In the past tense and infinitive subparadigms, [dʲ] is followed by a vocalic verbal suffix, but due to the truncation alternation this vowel is not attested before the V-initial endings in the present tense and imperative subparadigms. In other words, in pattern B the softening and truncation alternations conspire to create an opposition between the present tense and imperative subparadigms on the one hand, and the past tense and infinitive on the other.

The default pattern C is more heterogeneous than the other patterns. For present purposes, it is necessary to distinguish between two classes of verbs. In section 10.1 I tentatively assigned [j]-final stems to pattern C. These verbs have stem-final [j] throughout the present tense and imperative subparadigms. The shape of the stem is therefore compatible with the topmost schema in Figure 11.1. In the past tense and infinitive subparadigms, however, the stem ends

the face of it, past passive participles of this kind may seem problematic for the analysis in Figure 11.1, since the consonant with the feature [alveo-palatal] and the V-initial ending occur in a form that is traditionally considered part of the past tense subparadigm. However, in section 5.5 I pointed out that the past passive participle has perfect meaning, insofar as it denotes an event in the past that results in a state in the present. For example, the past passive participle [srazˌ+ón] 'slain' both involves a slaying event in the past and the state of being slain in the present. Since past passive participles of this sort involve present tense meaning and a consonant with the feature [alveo-palatal] followed by a V-initial suffix, they are not at variance with the schemas in Figure 11.1, but rather provide further corroboration of the proposed analysis.

in a vowel; because of the truncation alternation, the stem-final [j] is not attested in these forms, which have C-initial endings. Once again, therefore, we have an opposition between the present tense and imperative forms where the stem complies with the topmost schema in Figure 11.1, and the past tense and infinitive forms where the stem does not.

The remaining verbs in pattern C have the target of the softening alternation in the imperative and the present tense subparadigms, except the forms with endings in [u]. Furthermore, the present passive participle has a hard consonant in stem-final position, as we saw in section 10.4. These exceptions notwithstanding, the default for the present tense and imperative subparadigms is to have a V-initial ending and a consonant with the feature [alveo-palatal] in stem-final position. In other words, the default is compatible with the topmost schema in Figure 11.1. Notice that although verbs like *maxnut'* 'wave' in Table 11.1 do not have the feature [alveo-palatal] in the stem-final consonant in all present tense and imperative forms, the stem is C-final throughout the present tense and imperative subparadigms. This is due to the truncation alternation, which prevents the vowel in the verbal suffix from occurring before the V-initial endings in the present tense and imperative subparadigms. Thus verbs like *maxnut'* display an opposition between the present tense/imperative subparadigms and the remainder of the paradigm. In the present tense and imperative forms, the stem ends in a consonant, which in the default case has the [alveo-palatal] feature. In the past tense and infinitive subparadigms, the stem ends in a vowel.[113]

In the beginning of this chapter, I asserted that the truncation and softening alternations have a meaning. We have seen that the two alternations create an opposition between the present tense and imperative subparadigms on the one hand, and the past tense and infinitive subparadigms on the other. We have furthermore seen that it is possible to state a schema for the present tense and imperative subparadigms, which involves a stem ending in a consonant with the feature [alveo-palatal] followed by a V-initial ending. This schema has non-past meaning. In other words, from the presence of the V-initial ending and

113 For some verbs in pattern C, the opposition is less pronounced than for *maxnut'*. A case in point is the fairly small class of non-suffixed verbs with an obstruent in root-final position, e.g. *vesti* 'lead'. The truncation relation does not apply to these verbs and hence does not contribute to the opposition between the present tense/imperative subparadigms and the remainder of the paradigm. However, even for verbs like *vesti*, the phenomena discussed in chapters 6 and 7 set the stem of some past tense and infinitive forms apart from that in the present tense and imperative subparadigms. For instance, while *vesti* has [d] or [dʲ] in stem-final position in the present tense and imperative subparadigms (e.g. [vʲidʲ+ót] '(s/he) leads'), the finite past tense forms (e.g. [vʲo+l] '(he) led') and infinitive ([vʲisʲ+tʲí]) lack this consonant.

the [alveo-palatal] feature in the stem-final consonant a speaker can make the inference that s/he is dealing with a form with non-past meaning. In this way, the formal properties in question have a signifying function – they signify non-past meaning. Since the formal properties are the result of the truncation and softening alternations, non-past is the meaning of these alternations.

I started this chapter by suggesting that the question about the meaning of the truncation and softening alternations allows us to bring the two alternations together. We are now in a position to see how. The opposition that bisects the verbal paradigm and forms the basis for my argument about meaning is created by the two alternations working in concert. If we investigated the two alternations separately, we would not be able to state the generalizations captured by the schemas in Figure 11.1. Only if we consider the combined impact of the truncation and softening alternations, can we capture their joint function as markers of non-past meaning.

11.2. Segmentation, product-oriented generalizations and a semiotic approach to grammar

The analysis developed in the previous section bears on two theoretical issues: segmentation and product-oriented generalizations. These issues are the topic of this section. I use "semiotic" in the heading because both issues pertain to the way Cognitive Grammar represents the connection between meaning and form in terms of schemas, which are signs in the semiotic sense (cf. section 5.1.2).

Segmentation of words into morphemes plays a pivotal role in traditional morphological analysis. By drawing a morpheme boundary after the three first segments in [v^{j}idú], the traditional analyst is able to account for the fact that [v^{j}id] carries the lexical meaning 'lead', while [u] marks 1 singular present tense. Earlier in this study we have seen many examples where segmentation is essential. A case in point is the analysis of the past tense and infinitive of non-suffixed verbs in chapters 6 and 7, where it was necessary to refer to the right edge of the root morpheme in order to capture relevant generalizations. In Cognitive Grammar, segmentation into morphemes is accounted for by means of the integration relation, which accommodates the relationship between parts and wholes (cf. section 2.6). This being said, however, it seems fair to say that Cognitive Grammar downplays the role of segmentation into morphemes. As pointed out in section 4.4, schemas and categorization relations also enable us to capture generalizations about the relationship between meaning and form without segmentation. A schema for a set of forms contains the string of segments shared by all members of the set and the meaning associated with this

string, regardless of whether the string in question constitutes a morpheme or not according to traditional criteria.

At this point the question arises as to whether there is empirical evidence in favor of an approach that downplays the role of segmentation. The analysis of the truncation and softening alternation in the previous section provides such evidence. Consider again Figure 11.1, where the phonological pole of the topmost schema involves a consonant with the [alveo-palatal] feature followed by a vowel. As argued in the previous section, this CV string signals non-past meaning. Importantly, however, the string in question does not correspond to a morpheme according to traditional criteria. On the contrary, the consonant belongs to the stem, while the vowel is the first segment of the inflectional ending. It is difficult to see how this state of affairs can be accounted for in a model that relies solely on segmentation into morphemes, because in such a model the morpheme is the unit that carries meaning. In Cognitive Grammar, on the other hand, the situation depicted in Figure 11.1 is not problematic. Schemas offer a straightforward account of the realization of non-past meaning by the CV string, even though the C and V are not morphemes in isolation, nor is the CV string itself a morpheme. By downplaying the role of segmentation, Cognitive Grammar enables us to capture the generalization about the meaning of the truncation and softening alternations. In this way, the analysis developed in the previous section provides evidence in support of Cognitive Grammar.

In the previous section the word "conspiracy" was used several times (see also sections 5.1.3 and 8.4). The truncation and softening alternations conspire, as it were, to create an opposition between the present tense and imperative subparadigms on the one hand, and the past tense and infinitive on the other. As we have seen, the present tense and imperative forms differ from the remainder of the paradigm by having a consonant with an alveo-palatal place of articulation before a V-initial ending. The truncation alternation contributes the C+V pattern, while the softening alternation makes sure that the consonant carries the feature [alveo-palatal]. In the analysis of the imperative in chapter 8, I argued that conspiracies of this sort provide support for so-called product-oriented generalizations. Recall from sections 2.4 and 8.4 that product-oriented generalizations specify the properties of some well-formed structure, without explaining how it has been constructed on the basis of another structure. My argument about the imperative went like this: the shape of the imperative emerges as the result of the interaction of two independent rules. In isolation, neither rule captures the generalization about the shape of the imperative, so in order to account for this generalization we need a way to state well-formedness conditions for surface structures. In other words, we need a way to state product-oriented generalizations. In rule-based models, one has to invoke special devices like filters

or constraints in order to accommodate product-oriented generalizations. By contrast, in Cognitive Grammar product-oriented generalizations do not require any extra machinery, as they can be straightforwardly represented as first-order schemas.

A parallel argument can be constructed on the basis of Figure 11.1 in the previous section. The topmost schema – a first-order schema – captures a generalization about the shape of the present tense and imperative forms. This shape results from the interaction of two different phenomena, which I have referred to as the "truncation" and "softening alternations" in this book. It would be possible to generate the correct present and imperative forms if we devised a softening rule and a truncation rule and specified how they are ordered with regard to each other. However, neither rule would capture the generalization about the shape of the forms in question; the generalization would appear to be a coincidence deriving from the application of both rules. Therefore, we need a way to represent the product-oriented generalization that non-past meaning and a consonant with the feature [alveo-palatal] followed by a V-initial ending are characteristic for the present tense and imperative subparadigms. As shown in Figure 11.1, this generalization can be accounted for in Cognitive Grammar by means of a simple first-order schema.

Both the segmentation and conspiracy issues discussed above concern the way Cognitive Grammar and cognitive linguistics in general captures generalizations by means of schemas. By downplaying the role of segmentation and enhancing product-oriented generalizations, schemas enable us to capture the joint function of the truncation and softening alternations. The two alternations create an opposition that bisects the Russian verbal paradigm, and jointly function as markers of non-past meaning. The focus on meaning in this chapter is not accidental. Schemas are essentially signs in the semiotic sense of the word insofar as they connect a form with the meaning it conveys. Adopting a semiotic approach to language, Cognitive Grammar places itself in a long tradition in general and Slavic linguistics. As pointed out in sections 2.2 and 5.1.2, schemas are related to Saussurian signs, which is why Langacker (1987: 11) starts his two volumes *Foundations of Cognitive Grammar* (1987 and 1991) with a discussion of Saussure's (1984: 99) famous diagram describing the relationship between meaning and form in the noun *arbre* 'tree'. Another important forerunner of cognitive linguistics is Roman Jakobson. As shown in section 5.2, Jakobson's work was instrumental in the early development of generative linguistics. However, at the same time, Jakobson adopted a semiotic approach, seeking to establish the meanings of grammatical categories. Important examples include Jakobson's (1936, 1958) studies of the Russian case system where he argued that the cases have invariant meanings. Jakobsonian invariants correspond to the

topmost schemas in the structured networks of cognitive linguistics. However, as Janda (1993: 311) points out, Jakobson must have been aware that there is more to a category than the topmost schema, because he coins the term "relative invariant", which enables him to relate the variety of specific meanings to the invariant of the category. Continuing and refining the Saussurian and Jakobsonian semiotic tradition, cognitive linguistics has developed a fine-tuned set of tools for the analysis of the meaning of linguistic categories where schemas connected by categorizing networks constitute structured networks. Earlier in this book, we have seen that an approach along these lines enables us to disentangle the complexities of the truncation and softening alternations. In this chapter, it has been shown that Cognitive Grammar brings the two alternations together, explaining how they conspire to convey meaning.[114]

11.3. Conclusion

In this chapter, we have seen that Cognitive Grammar enables us to capture the meaning of the truncation and softening alternations, which I have argued function as markers of non-past meaning. The reason why Cognitive Grammar facilitates an insightful analysis is that it accounts not only for each set of alternations in isolation, but also accommodates their interaction in a conspiracy to convey meaning. Two aspects of the framework have been shown to be particularly important. First, Cognitive Grammar's ability to capture product-oriented generalizations is a prerequisite for a successful analysis of the truncation-softening conspiracy. Second, the analysis of the conspiracy hinges on Cognitive Grammar's ability to represent the signifying function of strings of segments that by traditional criteria are not morphemes. These properties enable Cognitive Grammar to accommodate the semiotic function of the truncation and softening alternations as markers of non-past meaning.

114 In connection with the semiotic aspect of Cognitive Grammar and cognitive linguistics, Shapiro's (1980) analysis of Russian conjugation from a semiotic perspective deserves mention. Shapiro uses a different framework and does not address the same questions as the present study, but his elegant analysis is not at variance with the account I propose in this book.

Chapter 12
Conclusion: Looking back … and ahead

In the beginning of chapter 1, I asked two questions: How can the morphology-phonology interface be accommodated in Cognitive Grammar? Do morpho-phonological alternations have a meaning? These two questions gave rise to two stories that unfolded in parallel throughout the book. The first, theoretical story concerns Cognitive Grammar as a theory of what has been called "morphophonology" or "abstract phonology". I have developed a model of alternations in Cognitive Grammar, and addressed key theoretical issues like abstractness, product-oriented generalizations, phonological opacity, and the non-modularity of grammar. The second story of this book is about Russian verbs. I have proposed generalizations that cover both the truncation and softening alternations, and analyzed the relationships between the alternants as well as the environments conditioning the alternations in detail. More importantly, however, I have focused on the interaction between the two sets of alternations, which I argue conspire to convey non-past meaning. Looking back, I will summarize the highlights of the two stories in sections 12.1 and 12.2. However, in section 12.3 I invite the reader to look ahead and consider the implications of my analysis for future research.

12.1. The morphology-phonology interface in Cognitive Grammar

Let us consider the theoretical story first. Addressing the morphology-phonology interface in Cognitive Grammar, I have emphasized the role of second-order schemas. I have argued that networks of schemas afford a restrictive theory of alternations based on a parsimonious set of cognitively motivated theoretical constructs. At the same time, the theory has proved insightful in that it accommodates generalizations ranging from broad statements about large classes of verbs to generalizations concerning only a handful of words. Further testifying to the fruitfulness of the approach is the fact that the proposed analysis has implications for several important theoretical issues, such as abstractness, product-oriented generalizations, phonological opacity and modularity. In the following, I will first summarize the theory of alternations, and then turn to the bigger theoretical issues.

The theory of alternations I advocate revolves around the following key questions:

(1) a. What is the relationship between the alternants?
b. What is the environment conditioning the alternation?
c. What role does the alternation play in the language system as a whole?

In this study, I have coined the term "second-order schema" for schemas over two structures and the categorizing relationship connecting them. Such schemas offer a straightforward way of **relating alternants** (cf. 1a). For instance, we can state that [p] alternates with [p^{j}] and [pl^{j}], but not, say, with [m^{j}] or [tʃ^{j}]. More importantly, by organizing the second-order schemas in structured category networks, we capture broader generalizations, e.g. that labials alternate with labials followed by [l^{j}] and that the target always has the feature [continuant]. Examples of networks of this type are given in Figures 5.2 and 5.3 in chapter 5 and Figures 9.3 and 9.7 in chapter 9.

Schemas furthermore enable us to characterize the **environment** that conditions an alternation (cf. 1b). Since schemas are bipolar structures connecting form and meaning, the conditioning environment can consist of phonological features like [rounded] or refer to meaningful structures like "present tense" – or a combination of both. The schemas for the truncation alternation advanced in section 5.4 illustrate the joint impact of meaning and form. I argue that the alternation is sensitive to both the shape and the meaning of the ending.

The bipolar nature of schemas has an interesting consequence. In the context of contemporary linguistics dominated by generative approaches, it may seem peculiar to ask what an alternation *means*. However, in Cognitive Grammar the question makes perfect sense. Bipolar schemas combining meaning and form are essentially Saussurian signs. If an alternant is conditioned by e.g. present tense, it makes sense to say that this alternant is a present tense marker, because it is part of a symbolic schema where present tense is the semantic pole. In chapter 11, I argued that the truncation and softening alternations create an opposition whereby the present tense and imperative subparadigms are set apart from the remainder of the paradigm. Since, as shown in chapter 5, non-past meaning is characteristic for these subparadigms, I conclude that the truncation and softening alternations convey non-past meaning. In this way, Cognitive Grammar enables us to tease out the meaning of the truncation and softening alternations.

It is important to remember that alternations do not exist in a vacuum, but are part of a larger picture. Developing a Cognitive Grammar theory of alternations, I have therefore focused on the **role of the alternations in the language system** as a whole (cf. 1b). This issue has three facets:

(2) a. Centrality
b. Productivity
c. Interaction

Cognitive Grammar enables us to distinguish between **central and marginal alternations**, since central alternations are more entrenched. No additional theoretical apparatus is required in order to account for centrality, and the same holds for the related notion of **productivity**. In Cognitive Grammar, productivity follows from the relative salience of a schema and its instantiations. If a schema is more salient than its instantiations, it has some degree of productivity. The present study has focused on two types of **interaction between alternations**: competition and conspiracy. Cognitive Grammar accommodates the interaction between competing schemas by comparing candidates to grammar fragments. According to the principle of conceptual overlap, specific schemas take precedence over more general schemas. This format has proven fruitful in accounting for the interaction between alternations themselves, as well as for their interaction with other phenomena, e.g. phonological schemas for allophones and phonemes (cf. sections 9.2 and 10.5) and morphological schemas representing the structure of the Russian verb paradigm (cf. sections 10.3 and 10.4). Conspiracies occur when two alternations jointly serve as a marker of some meaning. Chapter 8 offered a discussion of alternations that conspire in the imperative. In chapter 11, I stated a schema that covers the truncation and softening alternations and showed that the two alternations conspire as markers of non-past meaning.

In addition to providing a restrictive and insightful theory of alternations, the Cognitive Grammar approach I have adopted in this study has implications for a number of larger theoretical issues:

(3) a. Abstractness (chapter 7)
b. Phonological opacity (chapters 8 and 10)
c. Product-oriented generalizations (chapters 8 and 11)
d. Non-modularity of grammar (chapter 10)

How **abstract** is phonology? How different are underlying representations from the surface structures we can observe? These questions have been a recurring theme in theoretical linguistics ever since linguists first became aware of the excessive power of Chomsky and Halle's (1968) SPE model. As we have seen in chapter 7, Cognitive Grammar offers a simple answer to the abstractness question. Since the content requirement (cited in section 2.2.) precludes reference to structures not occurring on the surface, there are no underlying representations in Cognitive Grammar, and hence no abstractness in the relevant sense.

Linguists are eager to claim that their frameworks are restrictive. The discussion of the abstractness problem in chapter 7 shows that Cognitive Grammar is truly restrictive. Not only is abstractness ruled out: Cognitive Grammar admits only a parsimonious set of cognitively motivated structures in the analysis of language. The restrictiveness of Cognitive Grammar brings up the question of whether the framework has sufficient descriptive power. Can Cognitive Grammar account for phenomena that are traditionally analyzed by means of ordered, procedural rules and abstract underlying representations? In this book, I have explored several phenomena from Russian in great detail. We have seen that Cognitive Grammar facilitates insightful analyses in terms of competing schemas of different degrees of specificity. This suggests that Cognitive Grammar combines principled restrictions with sufficient descriptive power.

A theoretical question that has been much debated in Optimality Theory, but has received little attention among cognitive linguists, is **phonological opacity** (cf. 2b). Opacity occurs when a phenomenon is attested outside its conditioning environment, or when a phenomenon is not attested in its conditioning environment (cf. section 3.6). Taking advantage of the notion of "morphologization" from Natural Morphology, I have argued that opacity results from the misidentification of morphologically conditioned alternations as phonologically conditioned. Once the morphological environment is identified, the opacity problem evaporates. Adherents of Natural Morphology, who might think this is stating the obvious, should be reminded of the plethora of approaches in Optimality Theory that analyze opacity in purely phonological terms. In this book, it has been argued that such approaches cannot be restated in Cognitive Grammar because they are at variance with fundamental assumptions in cognitive linguistics. The contribution of Cognitive Grammar, therefore, is to force the analyst to consider phonological opacity in its proper morphological context. In sections 8.1–8.3 and 10.2 we have seen that Cognitive Grammar offers insightful analyses of the cases of opacity attested in the truncation and softening alternations.

As opposed to the traditional source-oriented generalizations, **product-oriented generalizations** (cf. 2c) specify the properties of some well-formed structure without relating it to any "source" on which it is purportedly based. While product-oriented generalizations are problematic from the perspective of rule-based approaches, Cognitive Grammar captures both source- and product-oriented generalizations straightforwardly. Interestingly, Cognitive Grammar gives primacy to product-oriented generalizations which are represented as first-order schemas. In order to represent source-oriented generalizations in Cognitive Grammar we need more complex second-order schemas. In this book, we have seen numerous examples of source- and product-oriented generalizations. Two examples of product-oriented generalizations are of particular importance

because they involve conspiracies between alternations. In chapter 8, I stated a schema for the imperative singular, which ends in a palatal segment, and in chapter 11 I advanced a schema for the conspiracy of truncation and softening as markers of non-past meaning.

Do grammars consist of self-contained, largely independent modules that perform different tasks? While modularity is one of the core properties of generative grammars, Cognitive Grammar is **non-modular** (cf. 2d). Grammar and lexicon constitute a continuum where schemas for phonological, morphological and syntactic constructions are integrated in large category networks that capture generalizations of different degrees of specificity. The analyses presented in this book clearly illustrate the advantages of a non-modular conception of grammar. In chapter 10, we have seen that schemas for the truncation and softening alternations interact closely with schemas for phonological segments on the one hand and morphological schemas for paradigm structure on the other. Because Cognitive Grammar recognizes the existence of direct interaction among schemas, we can capture generalizations that might otherwise have been overlooked.

The discussion of non-modularity takes us back to the question in the heading of this section, viz. how the morphology-phonology interface is accounted for in Cognitive Grammar. The answer is that strictly speaking there is no interface; since there are no autonomous modules in the grammar there is no need for special measures to connect the modules. Instead, we have seen that networks of schemas connected by categorizing relationships facilitate restrictive and insightful analyses of "morphophonology" or "abstract phonology" – including the complexities of the truncation and softening alternations in Russian, to which we turn in the following section.

12.2. Meaning and the truncation and softening alternations

The story about Russian verbs I have told in this book offers a thorough analysis of the truncation and softening alternations in Russian conjugation. The analysis explores the minutiae of the alternations in great detail, but the reader should not lose sight of the main conclusion, which is simple: the alternations have a meaning. As shown in chapter 11, the two alternations conspire to create an opposition that sets the present tense and imperative subparadigms apart from the remainder of the paradigm. On this basis, I have proposed that the two alternations jointly serve as markers of non-past meaning. The alternations should not be viewed as complicating factors obfuscating the unity of the verbal paradigm, but rather considered a vehicle for conveying meaning.

In order to demonstrate how the truncation and softening alternations work in concert as markers of non-past meaning, it was first necessary to analyze each alternation separately. In chapter 5, I argued that the truncation alternation is not conditioned by meaning *or* form alone, but that both factors are equally important. This conclusion has implications for a long-standing issue in Slavic linguistics: the debate about the relative merits of the so-called One-Stem and Two-Stem Systems for the description of Russian conjugation. This debate has been obscured by the failure to distinguish between linguistic models and descriptive generalizations. Once these factors are kept apart, it is possible to advance a synthesis that captures both the form-based generalizations in the Jakobsonian One-Stem System and the meaning-based generalizations implicit in the Two-Stem System.

Chapter 5 focused on the default patterns. However, a full-fledged analysis must also take into account several special cases involving the infinitive, past tense and imperative subparadigms. These cases were discussed in depth in chapters 6, 7 and 8. It was argued that exceptional infinitive, past tense and imperative forms constitute well-defined classes, for which simple generalizations were made explicit. The generalizations form nested structures, where specific generalizations override more general statements, which in turn override the global default patterns analyzed in chapter 5. The special cases do not jeopardize the default patterns, but rather provide supplementary generalizations that interact with the defaults. An overview of the generalizations pertaining to the truncation alternation are given in (4)–(7), where C+V stands for a consonant-final stem followed by a vowel-initial ending, while V+C represents a vowel-final stem followed by a consonant-initial ending:

(4)	Default (chapter 5):			
	a. Non-past:	C+V	[igráj+it]	‘s/he plays’
	b. Past/infinitive:	V+C	[igrá+l]	‘he played’
(5)	Infinitive (chapter 6):			
	a. Non-suffixed, stem-final [k, g]:	Vtʃʲ	[pʲetʃʲ]	‘to bake’
	b. Non-suffixed, stem-final obstruent:	sʲ+tʲ(i)	[nʲisʲ+tʲí]	‘to carry’
(6)	Past tense (chapter 7):			
	a. Non-suffixed, unrounded V, stem-final [d]:	V+C	[krá+la]	‘she stole’
	b. Non-suffixed, stem-final [t, d], finite:	V+C	[vʲi+lá]	‘she led’

c.	Non-suffixed, stem-final [t, d], non-finite:	C+C	[vʲét+ɕij]	‘having let’
d.	Non-suffixed, stem-final obstruent:	C+C	[nʲis+lá]	‘she carried’

(7) Imperative (chapter 8):

a.	Stem stress, single stem-final C, singular:	C+Ø	[brosʲ]	‘throw! (sg)’
b.	Stem stress, single stem-final C, plural:	C+tʲe	[brósʲ+tʲi]	‘throw! (pl)’

Following the discussion of truncation in chapters 5 through 8, the story about Russian verbs continued with the softening alternation in chapters 9 and 10. The softening alternation is a cover term for a variety of consonant∼consonant alternations that are traditionally grouped in two types: “plain softening” and “transitive softening”. In chapter 9, I showed that the complexity of the patterns is due to the interaction of two phenomena: palatalization and lenition. Keeping these phenomena distinct, I advanced a number of broad generalizations that cover all types and subtypes of the alternation, including the labial subtype of the transitive softening alternation, which on the face of it behaves very differently from lingual segments. The most important generalizations are given in (8). Generalizations (8a-b) concern palatalization and (8c) lenition:

(8) a. The target of the plain softening alternation has a palatal (primary or secondary) place of articulation.
b. The target of the transitive softening alternation has an alveo-palatal (primary or secondary) place of articulation at its right edge.
c. The target of the transitive softening alternation has a continuant at its right edge.

Chapter 10 analyzed the environments that condition the plain and transitive softening alternations. I argued that the distribution of the alternations is predictable on the basis of the shape of the stem, as well as the shape and meaning of the ending. Stated in simple terms, this means that if you know what the stem looks like, and which ending the verb has, you have the information you need in order to get the softening right. As for the stem, the relevant information is which verbal suffix (if any) a verb contains and how many syllables the stem consists of. With regard to the ending, the target of the softening alternation is only found before vowel-initial endings with non-past meaning. Among the vowel-initial endings with non-past meaning, those beginning with [u] behave differently, insofar as plain, but not transitive softening is blocked in this en-

vironment. Simplifying somewhat, the generalizations can be summarized as follows (cf. section 10.1):

(9)

a.	Verbal suffix [a, o], polysyll. stem:	Trans. before V/non-past
b.	Verbal suffix [i, e]:	Trans. before [u]/1 sg non-past
c.	Elsewhere:	Plain before V/non-past, not before [u]

These generalizations account for the softening alternation in the majority of cases. However, the distribution in participles is sensitive to the following generalizations (cf. sections 10.3 and 10.4):

(10) a. If a verb has the target of the softening alternation in part of the present tense and imperative subparadigms and the past passive participle has a V-initial ending, then the target of the softening alternation is found in the past passive participle.
b. Present tense participles have the same stem as the 3 plural present tense form.

The generalizations in (10) shows how the softening alternation interact with morphological schemas for paradigm structure. However, a purely phonological factor is also at work. In chapter 10, we saw that the structure of the segment inventory has a bearing on the softening alternation. Generalization (9c) covers verbs with plain softening. However, if verbs of this type have one of the velar plosives [k, g] in root-final position, the expected target of the plain softening alternation is "replaced" by the target of the transitive softening alternation. In section 10.5, I suggested that this is due to the ban against the palatal obstruents [c, ɟ, ç] before non-front vowels. As this constraint is being weakened and the palatal obstruents are gaining phonemic status in present-day Russian, we expect variation between the plain and transitive alternations in the relevant verb type – a prediction that is borne out by the facts.

The story about the truncation and softening alternations culminates in chapter 11, which explores the conspiracy between the two alternations to convey non-past meaning. When studied in isolation, the truncation and softening alternations appear to be meaningless idiosyncrasies whose only contribution is to make Russian verb inflection more complex. On the contrary, I argue that the two alternations must be studied together, because otherwise we would fail to recognize that the truncation and softening alternations fulfill a semiotic function in the language as markers of meaning.

12.3. Conclusion: Endings and beginnings

This book has shown that Cognitive Grammar offers a restrictive and insightful approach to alternations and "abstract phonology" in general. The approach is *restrictive* in that it involves a parsimonious set of cognitively motivated concepts, which preclude the excessive power of ordered rules and abstract underlying representations. The approach is *insightful* in that it enables us to state broad generalizations in a straightforward way in terms of schemas and categorizing relations. The ability of Cognitive Grammar to account for seemingly diverse phenomena like phonology-morphology interaction and language change in terms of the same concepts also testifies to the insightfulness of the analysis. By showing that apparently unrelated phenomena are merely special cases of the same general cognitive phenomenon, the "concrete" model of Cognitive Grammar contributes new insights to the study of "abstract phonology".

This book also contributes to the study of Russian verbs. I have suggested several generalizations about the truncation and softening alternations, and investigated both the relationships between the alternants and the environments conditioning the alternations in great detail. I have furthermore explored the interaction of the two sets of alternations, arguing that they have a semiotic function in that they conspire to signal non-past meaning. In this way, my analysis of the truncation-softening conspiracy shows that these alternations are not remnants of historic change that represent arbitrary complications of the synchronic grammar of Russian. Rather, the truncation and softening alternations represent resources that are recruited by the language for the purpose of conveying meaning.

We have now reached the end of two stories, but at the same time we are at the beginning of many other stories. The issues I have dealt with and the answers I have proposed give birth to many new questions. Does the theory of alternations I have advanced accommodate all kinds of alternations? How can we analyze truncation and softening in other Slavic languages? What about the diachronic development of alternations? These and many other questions pertaining to phonology and morphology deserve attention in the future. Cognitive linguistics has a lot to offer to everybody interested in phonology and morphology.

References

Andersen, Henning

1969a The phonological status of the Russian labial fricatives. *Journal of Linguistics* 5: 121–127.

1969b Lenition in Common Slavic. *Language* 45: 553–574.

1980 Russian conjugation: Acquisition and evolutive change. In *Papers from the 4th International Conference on Historical Linguistics*, Elizabeth C. Traugott (ed.), 285–301. Amsterdam/Philadelphia: John Benjamins.

1995 Consonant reduction in Russian. In *The Language and Verse of Russia. In Honor of Dean S. Worth on his Sixty-Fifth Birthday*, Henrik Birnbaum and Michael S. Flier (eds.), 19–30: Moscow: Vostočnaja Literatura.

Anderson, Stephen R.

1985 *Phonology in the Twentieth Century. Theories of Rules and Theories of Representations*. Chicago and London: The University of Chicago University Press.

1992 *A-Morphous Morphology*. Cambridge: Cambridge University Press.

Aronoff, Mark

1994 *Morphology by Itself. Stems and Inflectional Classes*. Cambridge, Massachusetts and London, England: The MIT Press.

Avanesov, Ruben Ivanovič

1984 *Russkoe Literaturnoe Proiznošenie*. 6th ed. Moscow: Prosveščenie.

Barlow, Michael and Suzanne Kemmer (eds.)

2000 *Usage-Based Models of Language*. Stanford: CSLI Publications.

Baudouin de Courtenay, Jan

1972 Reprint. An attempt at a theory of phonetic alternations: A chapter from psychophonetics. In *A Baudouin de Courtenay Anthology,* Edward Stankiewicz (ed.), 144–212. Bloomington and London: Indiana University Press. Original edition, 1895.

Bauer, Laurie

2001 *Morphological Productivity*. Cambridge: Cambridge University Press.

Benua, Laura

1997 Transderivational identity: Phonological relations between words. Ph.D. diss., University of Massachusetts at Amherst.

Bermudez-Otero, Ricardo

forthcom. *Stratal Optimality Theory: Synchronic and Diachronic Applications.* Oxford: Oxford University Press.

Blaho, Sylvia, and Patrik Bye
to appearCryptosonorants and the misapplication of voicing assimilation in Biaspectual Phonology. In *Proceedings of the 31st Annual Meeting of the Berkeley Linguistics Society*. Berkeley, California: Berkeley Linguistics Society.

Blevins, James P.
2006 Word-based morphology. *Journal of Linguistics* 42: 551–573.

Bloomfield, Leonard
1933 *Language*. New York: Henry Holt and Company.

Bondarko, Aleksandr Vladimirovič
1971 *Vid i vremja russkogo glagola. Posobie dlja studentov*. Moscow: Prosveščenie.

Booij, Geert
2005 Compounding and derivation. Evidence for Construction Morphology. In *Morphology and its Demarcations: Selected Papers From the 11th Morphology Meeting, Vienna, February 2004,* Wolfgang U. Dressler (ed.), 109–133. Amsterdam/Philadelphia: John Benjamins.

Browman, Catherine, and Louis Goldstein
1991 Gestural structures: Distinctiveness, phonological processes, and historical change. In *Modularity and the Motor Theory of Speech Perception,* Ignatius G. Mattingly and Michael Studdert-Kennedy (eds.), 313–338. Hillsdale: Erlbaum.

Bybee, Joan
1985 *Morphology*. Amsterdam/Philadelphia: John Benjamins.
1988 Morphology as lexical organization. In *Theoretical Morphology. Approaches in Modern Linguistics,* Michael Hammond and Michael Noonan (eds.), 119–141. San Diego, New York, Berkeley, Boston, London, Sydney, Tokyo and Toronto: Academic Press.
2000 The phonology of the lexicon: Evidence from lexical diffusion. In *Usage-Based Models of Language,* Suzanne Kemmer and Michael Barlow (eds.), 65–85. Stanford: CSLI Publications.
2001 *Phonology and Language Use*. Cambridge: Cambridge University Press.

Bybee, Joan, and Carol Lynn Moder
1983 Morphological classes as natural categories. *Language* 59: 251–270.

Bybee, Joan, and Dan Slobin
1982 Rules and schemas in the development and use of the English past tense. *Language* 58: 265–289.

Bye, Patrik A.
2002 Virtual phonology: Rule sandwiching and multiple opacity in North Saami. Doctoral diss., University of Tromsø.

Catford, John C.
1977 *Fundamental Problems in Phonetics.* Edinburgh: Edinburgh University Press.

Chomsky, Noam
1986 *Knowledge of Language. Its Nature, Origin, and Use*. Westport and London: Praeger.

Chomsky, Noam, and Morris Halle
1968 *The Sound Pattern of English*. New York: Harper & Row.

Chvany, Catherine V.
1990 The two-stem nature of the one-stem verb system: Another look at classes and exceptions. *The Slavic and East European Journal* 34 (4): 421–438.

Clements, George N., and Elizabeth V. Hume
1995 The internal organization of speech sounds. In *The Handbook of Phonological Theory,* John A. Goldsmith (ed.), 245–306. Oxford: Basil Blackwell.

Corbett, Greville G., and Norman M. Fraser
1993 Network Morphology: a DATR account of Russian nominal inflection. *Journal of Linguistics* 29: 113–142.

Coulson, Seana, and Todd Oakley
2000 Blending basics. *Cognitive Linguistics* 11 (3–4): 175–196.

Croft, William
2001 *Radical Construction Grammar*. Oxford: Oxford University Press.
2006 On explaining metonymy: Comment on Peirsman and Geeraerts, "Metonymy as a prototypical category". *Cognitive Linguistics* 17 (3): 317–326.

Croft, William, and D. Alan Cruse
2004 *Cognitive Linguistics*. Cambridge: Cambridge University Press.

Crosswhite, Katherine
2001 *Vowel Reduction in Optimality Theory*. New York and London: Routledge.

Dąbrowska, Ewa
2004 *Language, Mind and Brain*. Washington, D.C.: Georgetown University Press.

Dickey, Stephen M.
2000 *Parameters of Slavic Aspect: A Cognitive Approach.* Stanford, California: CSLI Publications.

Divjak, Dagmar
2004 Degrees of verb integration: Conceptualizing and categorizing events in Russian. Doctoral diss., Katholieke Universiteit Leuven.

Dressler, Wolfgang U.
1985 *Morphonology: The Dynamics of Derivation*. Ann Arbor: Karoma Publishers.
1990 The cognitive perspective of "naturalist" linguistic models. *Cognitive Linguistics* 1 (1): 75–98.

Dressler, Wolfgang U., Willi Mayerthaler, Oswald Panagl and Wolfgang U. Wurzel
1987 *Leitmotifs in Natural Morphology*. Amsterdam: John Benjamins.

Dressler, Wolfgang U., and Natalia V. Gagarina
1999 Basic questions in establishing the verb classes of contemporary Russian. In *Essays in Poetics, Literary History and Linguistics Presented to V.V. Ivanov on the Occasion of his Seventieth Birthday,* L. Fleishman, M. Gasparov, T. Nikolaeva, A. Ospovat, V. Toporov, A. Vigasin, R. Vroon and A. Zaliznjak (eds.), 754–760. Moscow: OGI

Elman, Jeffrey L., and James L. McClelland
1984 Speech perception as a cognitive process: The interactive activation model. In *Speech and Language. Advances in Basic Research and Practice* (vol. 10), Norman J. Lass (ed.), 337–374. Orlando: Academic Press.

Fauconnier, Gilles, and Mark Turner
2002 *The Way We Think. Conceptual Blending and the Mind's Hidden Complexities*. New York: Basic Books.

Feldman, Jerome A.
2006 *From Molecule to Metaphor. A Neural Theory of Language*. Cambridge, Massachusetts, and London, England: The MIT Press.

Fillmore, Charles J.
1999 Inversion and constructional inheritance. In *Lexical and Constructional Aspects of Linguistic Explanation,* Gert Webelhuth, Jean-Pierre Koenig and Andreas Kathol (eds.), 113–128. Stanford: CSLI Publications.

Flier, Michael S.
1981 The morphology of the Russian active participle. *International Journal of Slavic Linguistics and Poetics* 24, 79–106.
1982 Morphophonemic change as evidence of phonemic change: The status of the sharped velars in Russian. *International Journal of Slavic Linguistics and Poetics* 25/26: 137–148.

Fodor, Jerry A.
1983 *The Modularity of Mind*. Cambridge, Massachusetts and London, England: The MIT Press.

Fraser, Norman M., and Greville G. Corbett
1997 Defaults in Arapesh. *Lingua* 103: 25–57.

Gagarina, Natalia
2003 The early verb development and demarcation of stages in three Russian-speaking children. In *Development of Verb Inflection in First Language Acquisition: A Cross-Linguistic Perspective,* Dagmar Bittner, Wolfgang U. Dressler and Marianne Kilani-Schoch (eds.), 131–170. Berlin and New York: Mouton de Gruyter.

Gazdar, Gerald, Ewan Klein, Geoffrey Pullum and Ivan Sag
1985 *Generalized Phrase Structure Grammar*. Oxford: Basil Blackwell.

Geeraerts, Dirk
1989 Prospects and problems of prototype theory. *Linguistics* 27, 587–612. (Reprinted in Dirk Geeraerts 2006 *Words and Other Wonders*. Berlin and New York: Mouton de Gruyter, 3–26.)

Goldberg, Adele E.
1995 *Constructions. A Construction Grammar Approach to Argument Structure*. Chicago and London: The University of Chicago Press.
2006 *Constructions at Work. The Nature of Generalization in Language*. Oxford: Oxford University Press.

Goldrick, Matthew
2000 Turbid representations and the unity of opacity. In *Proceedings of the North East Linguistics Society* 30 (1), M. Hirotani, A. Coetzee, N. Hall and J.-Y. Kim (eds.), 231–245. Amherst, MA: GLSA.

Goldsmith, John A. (ed.)
1995 *The Handbook of Phonology.* Oxford: Basil Blackwell.

Gor, Kira, and Tatiana Chernigovskaya
2003a Mental lexicon structure in L1 and L2 acquisition: Russian evidence. *GLOSSOS* 4, 1–31.
2003b Generation of complex verbal morphology in first and second language acquisition: Evidence from Russian. *Nordlyd* 31 (6), 819–833.

Gundersen, Helge
2001 Building blocks or network relations: Problems of morphological segmentation. In *A Cognitive Approach to the Verb. Morphological and Constructional Perspectives,* Hanne Gram Simonsen and Rolf Theil Endresen (eds.), 95–127. Berlin and New York: Mouton de Gruyter.

Gvozdev, A.N.
1949 *Formirovanie u rebenka grammatičeskogo stroja russkogo jazyka*. Moscow: Izdatel'stvo Akademii Pedagogičeskix nauk RSFSR.

Halle, Morris
1959 *The Sound Pattern of Russian*. The Hague: Mouton.
1963 O pravilax russkogo sprjaženija. In *American Contributions to the V. International Congress of Slavists, Sofia, Sept. 1963. Vol. 1. Linguistic Contributions*, 113–132. The Hague: Mouton.

Haslev, Marianne
1972 *Morfo-fonemikk*. Oslo, Bergen and Tromsø: Universitetsforlaget.

Haspelmath, Martin
1997 *From Space to Time. Temporal Adverbials in the World's Languages*. Munich and Newcastle: Lincom Europa.

Hauser, Marc D., Noam Chomsky and W. Tecumseh Fitch
2002 The faculty of language: What is it, who has it, and how did it evolve? *Science* 298: 1569–1579.

Hooper, Joan Bybee
1976 *An Introduction to Natural Generative Phonology*. New York, San Francisco and London: Academic Press.

Hudson, Richard A.
1990 *English Word Grammar*. Oxford: Basil Blackwell.

Isačenko, Alexander V.
1969 The development of the clusters **sk', *zg'* etc. in Russian. *Scando-Slavica* 15: 99–110.
1982 *Die Russische Sprache der Gegenwart. Formenlehre*. Munich: Max Hueber Verlag.

Itkin, Il'ja B.
2007 *Russkaja morfonologija*. Moscow: Gnozis.

Jakobson, Roman
1932 Zur Struktur des Russischen Verbums. In *Charisteria Guilelmo Mathesio Quinquagenerio a discipulis et circuli linguistici Pragensis sodalibus oblata*, 74–84. Prague: Cercle Linguistique de Prague.
1936 Beitrag zur allgemeinen Kasuslehre. *Travaux du Cercle Linguistique de Prague* 6: 240–288.
1948 Russian Conjugation. *Word* 4 (3): 155–167.
1956 Die Verteilung der stimmhaften und stimmlosen Geräuschläute im Russischen. In *Festschrift für Max Vasmer zum 70. Geburtstag*, Margarete Woltner and Herbert Bräuer (eds.), 199–202. Otto Harrasowitz: Wiesbaden.
1957 *Shifters, Verbal Categories, and the Russian Verb*. Cambridge, Massachusetts: Department of Slavic Languages and Literatures, Harvard University.
1958 Morfologičeskie nabljudenija nad slavjanskim skloneniem (sostav russkix padežnych form). In *American Contributions to the Fourth International Congress of Slavicists, Moscow, September 1958*, 127–156. The Hague: Mouton.

Janda, Laura A.
1993 Cognitive linguistics as a continuation of the Jakobsonian tradition. The semantics of Russian and Czech reflexives. In *American Contributions to the Eleventh Internation Congress of Slavists. Bratislava, August-September 1993. Literature, Linguistics. Poetics,* Robert A. Maguire and Alan Timberlake (eds.), 310–319. Columbus, Ohio: Slavica Publishers.
2000 Cognitive linguistics. Available at www.cognitivelinguistics.org
2004 A metaphor in search of a source domain: the categories of Slavic aspect. *Cognitive Linguistics* 15, 471–527.

Johnson, Mark
1987 *The Body in the Mind*. Chicago: The University of Chicago Press.

Jones, Daniel
1931 On phonemes. *Travaux du cercle linguistique de Prague* 4: 74–79.

Jones, Daniel, and Dennis Ward
1969 *The Phonetics of Russian*. Cambridge: Cambridge University Press.

Kavitskaya, Darya
1999 Voicing assimilations and the schizophrenic behavior of /v/ in Russian. In *Formal Approaches to Slavic Linguistics. The Seattle Meating 1998,* Katrzyna Dziwirek, Herbert Coats and Cynthia M. Vakareliyska (eds.), 225–244. Ann Arbor: Michigan Slavic Publications.

Kenstowicz, Michael, and Charles Kisseberth
1979 *Generative Phonology. Description and Theory*. New York, San Francisco and London: Academic Press.

Kiparsky, Paul
1973 Phonological Representations. In *Three Dimensions of Linguistic Theory,* Osamu Fujimura (ed.), 1–136. Tokyo: TEC Company, Ltd.
1982 From cyclic phonology to lexical phonology. In *The structure of phonological representations*. Vol. 1, Harry van der Hulst and Norval Smith (eds.), 131–176. Dordrecht, Holland and Cinnaminson, USA: Foris Publications.
2003 Syllables and moras in Arabic. In *The Syllable in Optimality Theory,* Caroline Féry and Ruben van de Vijver (eds.), 147–182. Cambridge: Cambridge University Press.

Kirchner, Robert
1998 An effort-based approach to consonant lenition. Ph.D. diss., University of California at Los Angeles.

Kisseberth, Charles W.
1970 On functional unity of phonological rules. *Linguistic Inquiry* 1 (3): 291–306.

Knjazev, Jurij Pavlovič
1989 *Akcional'nost' i statal'nost'. Ix sootnošenie v russkix konstrukcijax s pričastijami na -n, -t*. Munich: Verlag Otto Sagner.

Koutsoudas, Andreas, Gerald Sanders and Craig Noll
1974 The application of phonological rules. *Language* 50 (1): 1–28.

Kövecses, Zoltan
2002 *Metaphor: A Practical Introduction.* Oxford: Oxford University Press.

Krysin, L.P. (ed.)
1974 *Russkij jazyk po dannym massovogo obsledovanija*. Moscow: Nauka.

Kumashiro, Fumiko
2000 Phonotactic interactions: A non-reductionist approach to phonology. Ph.D. diss., University of California at San Diego.

Ladefoged, Peter, and Ian Maddieson
1996 *The Sounds of the World's Languages.* Oxford: Basil Blackwell.

Lakoff, George
1977 Linguistic gestalts. In *Papers from the Thirteenth Regional Meeting, Chicago Linguistic Society,* Woodford A. Beach, Samuel E. Fox and Shulamith Philosoph (eds.), 236–287. Chicago, Illinois: Chicago Linguistic Society.
1987 *Women, Fire, and Dangerous Things. What Categories Reveal about the Mind*. Chicago and London: The University of Chicago Press.
1993a Cognitive phonology. In *The Last Phonological Rule,* John Goldsmith (ed.), 117–145. Chicago and London: The University of Chicago Press.
1993b The contemporary theory of metaphor. In *Metaphor and Thought,* Andrew Ortony (ed.), 202–251. Cambridge: Cambridge University Press.

Lakoff, George, and Mark Johnson
1980 *Metaphors We Live By*. Chicago and London: The University of Chicago Press.
1999 *Philosophy in the Flesh*. New York: Basic Books.

Langacker, Ronald W.
1987 *Foundations of Cognitive Grammar. Vol. 1. Theoretical Prerequisites*. Stanford: Stanford University Press.
1991a *Foundations of Cognitive Grammar. Vol. 2. Descriptive Application*. Stanford: Stanford University Press.
1991b *Concept, Image, and Symbol*. Berlin and New York: Mouton de Gruyter.
1999 *Grammar and Conceptualization*. Berlin and New York: Mouton de Gruyter.

Lass, Roger
1984 *Phonology*. Cambridge: Cambridge University Press.

Laver, John
1994 *Principles of Phonetics*. Cambridge: Cambridge University Press.

Levin, Maurice I.
1978 *Russian Declension and Conjugation*. Columbus, Ohio: Slavica Publishers.

Lightner, Theodore M.
1967 On the phonology of Russian conjugation. *Linguistics* 35: 35–55.
1972 *Problems in the Theory of Phonology. Russian Phonology and Turkish Phonology*. Edmonton: Linguistic Research.

Lipson, Alexander
1981 *A Russian Course*. Columbus, Ohio: Slavica Publishers.

Lulich, Steven
2004 Russian [v]: An acoustic study. *Folia Linguistica* XXXVIII (1–2): 63–85.

Mandelblit, Nili
2000 The grammatical marking of xonceptual integration: From syntax to morphology. *Cognitive Linguistics* 11 (3–4): 197–251.

Maslov, Jurij S.
2004 O tipologii čeredovanij. In *Izbrannye trudy*, 757–764. Moscow: Jazyki slavjanskoj kul'tury.

Matthews, Peter H.
1972 *Inflectional Morphology. A Theoretical Study Based on Aspects of Latin Verb Conjugation*. Cambridge: Cambridge University Press.
1991 *Morphology*. 2nd ed. Cambridge: Cambridge University Press.

Matusevič, Margarita I.
1976 *Sovremennyj russkij jazyk. Fonetika.* Moscow: Prosveščenie.

McCarthy, John J.
1999 Sympathy and phonological opacity. *Phonology* 16 (3): 331–399.
2002 *A Thematic Guide to Optimality Theory.* Cambridge: Cambridge University Press.
2003 Sympathy, cumulativity, and the Duke-of-York gambit. In *The Syllable in Optimality Theory,* Caroline Féry and Ruben van de Vijver (eds.), 23–76. Cambridge: Cambridge University Press.
2005 Optimal paradigms. In *Paradigms in Phonological Theory,* Laura Downing, Tracy Alan Hall and Renate Raffelsiefen (eds.), 170–210. Oxford: Oxford University Press.
2007 *Hidden Generalizations. Phonological Opacity in Optimality Theory*. London/Oakville: Equinox.

McCarthy, John J., and Alan Prince
1995 Faithfulness and reduplicative identity. *University of Massachusetts Occasional Papers* 18: 249–384.

McClelland, James L., and Jeffrey L. Elman
1986 The TRACE model of speech perception. *Cognitive Psychology* 18: 1–86.

Mel'čuk, Igor A.
2000 *Kurs obščej morfologii.* Vol. 3. Moscow/Vienna: Jazyki russkoj kul'tury/ Wiener Slawistischer Almanach, Sonderband 38 (3).

Mompeán-González, José A.
2004 Category overlap and neutralization: The importance of speakers' classifications in phonology. *Cognitive Linguistics* 15 (4): 429–469.

Nathan, Geoffrey S.
1986 Phonemes as mental categories. In *Proceedings from the Twelfth Annual Meeting of the Berkeley Linguistics Society,* Vassiliki Nikiforidou, Mary Van Clay, Mary Niepokuj and Deborah Feder (eds.), 212–223. Berkeley: University of California at Berkeley.
1989 Preliminaries to a theory of phonological substance: The substance of sonority. In *Linguistic Categorization,* Roberta Corrigan, Fred Eckman and Michael Noonan (eds.), 56–67. Amsterdam/ Philadelphia: John Benjamins.
1996 Steps towards a cognitive phonology. In *Natural Phonology: The State of the Art,* Bernhard Hurch and Richard A. Rhodes (eds.), 107–120. Berlin and New York: Mouton de Gruyter.

Nesset, Tore
1998a *Russian Conjugation Revisited.* Oslo: Novus Press.
1998b Affiks eller klitikon? Om elementet *–sja* i moderne standard russisk. *Norsk Lingvistisk Tidsskrift* 16: 185–206.
1998c Antiphonotactic suffixation: Russian *-sja* and Optimality Theory. *Scando-Slavica* 44: 145–153.
2000 Iconicity and prototypes: A new perspective on Russian verbs of motion. *Scando-Slavica* 46: 105–119.
2004 Case assignment and image schemas: Russian temporal adverbials. *Studies in Language* 28 (2): 285–319.
2005 Allomorphy in the Usage-Based Model: The Russian past passive participle. *Cognitive Linguistics* 16 (1): 145–167.
2006 Gender meets the Usage-Based Model: Four principles of rule interaction in gender assignment. *Lingua* 116: 1369–1393.

Ožegov, Sergej Ivanovič, and Natalija Jul'evna Švedova
1992 *Tolkovyj slovar' russkogo jazyka*. Moscow: "AZЪ" Ltd.

Panov, Mixail Viktorovič
1967 *Russkaja fonetika*. Moscow: Prosveščenie.

Peirsman, Yves, and Dirk Geeraerts
2006a Metonymy as a prototypical category. *Cognitive Linguistics* 17 (3): 269–316.
2006b Don't let metonymy be misunderstood: An answer to Croft. *Cognitive Linguistics* 17 (3): 327–335.

Petrova, Olga, and Szilárd Szentgyörgyi
2004 /v/ and voice assimilation in Hungarian and Russian. *Folia Linguistica* XXXVIII (1–2): 87–116.

Požarickaja, Sof'ja Konstantinovna
1997 *Russkaja dialektologija*. Moscow: Izdatel'stvo Moskovskogo Universiteta.

Prince, Alan, and Paul Smolensky
2004 *Optimality Theory. Constraint Interaction in Generative Grammar*. Oxford: Basil Blackwell. (Revision of 1993 technical report, Rutgers Center for Cognitive Science.)

Rappaport, Gilbert C.
1984 *Grammatical Function and Syntactic Structure: The Adverbial Participle of Russian*. Columbus, Ohio: Slavica Publishers.

Rosch, Eleanor
1978 Principles of categorization. In *Cognition and Categorization,* Eleanor Rosch and Barbara B. Lloyd (eds.), 27–48. Hillsdale, NJ: Lawrence Erlbaum.

Sapir, Edward
1921 *Language*. New York: Harcourt, Brace and company.

Saussure, Ferdinand de
1984 Reprint: *Cours de linguistique générale*. Paris: Payot. Original edition, Paris: Payot, 1916.

Ščerba, Lev V.
1983 Reprint: *Russkie glasnye v kačestvennom i količestvennom otnošenii*. Leningrad: Nauka. Original edition, Saint Petersburg,1912.

Shapiro, Michael
1980 Russian conjugation: Theory and hermeneutic. *Language* 56 (1), 67–93.
1993 Russian non-distinctive voicing: A Stocktaking. *Russian Linguistics* 17: 1–14.

Stampe, David
1973 A dissertation on natural phonology. Ph.D. diss., University of Chicago.

Stump, Gregory T.
1993 On rules of referral. *Language* 69 (3): 449–479.
2001 *Inflectional Morphology: A Theory of Paradigm Structure.* Cambridge: Cambridge University Press.

Švedova, Natalija Jul'evna (ed.)
1980 *Russkaja grammatika*. Vol. 1. Moscow: Nauka.

Taylor, John R.
2002 *Cognitive Grammar*. Oxford: Oxford University Press.
2003 *Linguistic Categorization.* 3rd ed. Oxford: Oxford University Press.

Timberlake, Alan
2004 *A Reference Grammar of Russian*. Cambridge: Cambridge University Press.

Tomasello, Michael
2003 *Constructing a Language. A Usage-Based Theory of Language Acquisition*. Cambridge, Massachusetts and London, England: Harvard University Press.

Townsend, Charles E.
1975 *Russian Word-Formation*. Columbus, Ohio: Slavica Publishers.

Tuggy, David
2005 Neutralizations to *h* in Mösiehuali from the perspective of Cognitive Grammar. Paper presented at the International Cognitive Linguistics Conference, Seoul, July 2005.

Ussishkin, Adam, and Andrew Wedel
2001 Neighborhood density and the root-affix distinction. In *NELS: Proceedings of the North East Linguistic Society,* Masako Hirotani (ed.), 539–549. Amherst, Massachusetts: GLSA Publications.

Välimaa-Blum, Riitta
2005 *Cognitive Phonology in Construction Grammar. Analytic Tools for Students of English*. Berlin and New York: Mouton de Gruyter.

Vasmer, Max
1950–58 *Russisches etymologisches Wörterbuch*. Heidelberg: C. Winter Universitätsverlag.

Wilensky, Robert
1983 *Planning and Understanding. A Computational Approach to Human Reasoning*. Reading, Mass.: Addison-Wesley.

Wurzel, Wolfgang U.
1984 *Flexionsmorphologie und Natürlichkeit*. Berlin: Akademie-Verlag.
1989 *Inflectional Morphology and Naturalness*. Dordrecht, Boston and London: Kluwer Academic Publishers.

Zaliznjak, Andrej A.
1977 *Grammatičeskij slovar' russkogo jazyka*. Moscow: Russkij jazyk.

Zinder, Lev Rafailovič
1960 *Obščaja fonetika*. Leningrad: Izdatel'stvo leningradskogo universiteta.

Zwicky, Arnold M.
1991 Systematic versus accidental phonological identity. In *Paradigms. The Economy of Inflection,* Frans Plank (ed.), 113–131. Berlin and New York: Mouton de Gruyter.

Zwicky, Arnold M., and Geoffrey K. Pullum
1983 Cliticization vs. inflection: English n't. *Language* 59 (3): 502–513.

Author index

Subject index