THE EVOLUTION OF THE SLAVIC DUAL

A BIOLINGUISTIC PERSPECTIVE

TATYANA G. SLOBODCHIKOFF

The Evolution of
the Slavic Dual

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The Evolution of the Slavic Dual: A Biolinguistic Perspective, by Tatyana G.
    Slobodchikoff

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A Biolinguistic Perspective

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To the loves of my life, Misha and Kolya,
who surround me with love, strength, and inspiration.

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Acknowledgments

The writing of this book was inspired by the enigma of language change and linguistic intricacies that ask for an explanation. The history and evolution of dual number in Slavic languages has intrigued me since my PhD studies at the University of Arizona. Since that time, I have decided to pursue and explore the project of the Slavic dual in a book. I wanted to bring to light the historical changes in the Slavic dual and look at them from a biolinguistic perspective, which views language as a natural object subject to constraints of optimization of structure and efficiency of computation.

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Chapter 1

Introduction

1.1 THE LINGUISTIC PUZZLE OF DUAL NUMBER IN SLAVIC LANGUAGES

There is an incredible and systematic variation in how the world's languages express the concept of number. The simplest way to express number is to divide people or objects into two categories: one and more than one. This is a singular–plural number system. It is used by the majority of the world's languages. It is also possible to add a third number value to denote exactly two people or objects. This is known as dual number.[1] Currently, dual number is used only in a relatively small number of languages. For example, Upper Sorbian, a West Slavic language spoken in Eastern Germany, is one of the three contemporary Slavic languages (besides Lower Sorbian and Slovenian) with dual number. It has a three-way singular–dual–plural number system with the dual marked on all parts of speech—nouns, pronouns, adjectives, and verbs.

In languages with a singular–dual–plural number system, the dual has a unique status with regard to its semantic, morphological, and syntactic structure. The semantic composition of the dual is quite complex in comparison to the singular and plural. For example, in the domain of personal pronouns, the dual identifies *two* people—the speaker and the addressee (we two), the addressee and another third person (you two), and two other participants who are neither the speaker nor the addressee (they two).

This situation is exemplified in Upper Sorbian (West Slavic) which has dual pronouns for all three persons. The first-person dual *mój* ('we two') and the second-person dual *wój* ('you two') are shown in table 1.1. In addition to referring to two animate persons as in the case of personal pronouns, dual number can also be used with nouns to refer to two inanimate objects or

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entities. For example, in Upper Sorbian, the noun *hród* ("palace, castle") has a dual form *hrodaj* which refers to two palaces/castles (Corbett 2000, 20).

How do we understand that the dual refers to *two* persons or things? We interpret the dyad that the dual selects as a formal set that contains exactly two members. In contrast, the singular refers to one individual and forms a set with only one member. The plural refers to more than two, or at least three individuals and forms a larger set of three or more members. In comparison to the singular and plural, the reference set of two individuals that the dual picks out is clearly much more restricted than that of one or many. This property of having a restricted reference set makes the dual a semantically marked grammatical category in relation to the singular and plural.

Why is the dual more semantically marked than the singular and the plural? What are the reasons behind its semantic markedness? Semantic markedness is one of the most interesting and puzzling properties of dual number which fascinated linguists since the early nineteenth century. Since Wilhelm von Humboldt's (1827) first in-depth explanation of the semantics of dual number, a lot of progress has been made toward understanding its semantic structure both in the fields of linguistic typology (Meillet 1924; Greenberg 1963; Jespersen 1965; Plank 1989; Corbett 2000; Cysouw 2009) and theoretical linguistics (Harley and Ritter 2002; Cowper 2005; Sauerland 2003; Dvořák and Sauerland 2006; Chierchia et al. 2012; Harbour 2008, 2011a, 2011b). However, currently, the field of contemporary linguistics lacks in-depth studies on the semantic complexities of dual number in different languages. More cross-linguistic research is needed to properly understand how the semantics of the dual works in many of the world's languages.

Morphological expression of dual number varies greatly, cross-linguistically, and deserves a special mention. In the few contemporary languages with the dual, such as Slovenian (South Slavic), Upper Sorbian (West Slavic), Lower Sorbian (West Slavic), Modern Standard Arabic (Afro-Asiatic), Labrado-Inuttitut dialect of Inuktitut (Eskimo-Aleut), Hebrew (Afro-Asiatic), Tonkawa (isolate), Kiowa (Kiowa-Tanoan), Nen (South Central Papuan), Manam (Austronesian), Warlpiri (Australian), Kawaiisu (isolate), Hopi (Uto-Aztecan), Zuni (isolate) as well as in ancient languages such Old East Slavic (East Slavic), Old Church Slavic (South Slavic), Old Sorbian (West Slavic), Old Slovenian (South Slavic), classical Arabic (Afro-Asiatic), Ancient Greek (Hellenic), Sanskrit (Indo-Aryan), Old English (Germanic), Old Icelandic (Germanic), Gothic (Germanic), dual number is expressed by inflection: by suffixes and prefixes as well as by the so-called constructed dual forms.[2]

Morphological make-up of the dual reveals many of its interesting properties. For example, in contemporary standard Slovenian (South Slavic), dual number is expressed by suffixes on pronouns and nouns as well as on verbs, adjectives, and participles (by subject/verb agreement). Considering

Slovenian nouns, we notice that in the dual they are marked by the suffixes –*a* and –*i* depending on the noun class and gender. It is important to note that in Slovenian dual suffixes are morphologically distinct from their singular and plural counterparts except for instances of syncretism when dual and plural forms appear to be identical. For example, the dual and plural of the noun *stvar* "thing" share the same suffix –*i* in the dual and plural. The key observation about dual number here is that we have an instance of dual/plural syncretism in the nominal paradigm. In Slovenian, dual/plural syncretism occurs not only in the nominative case, but it is widespread and occurs in other cases of the Slovenian nominal paradigm (Marušič and Žaucer 2018, 2).

Morphological syncretism, or identity of form of different grammatical categories, is typical for dual number cross-linguistically and serves as a direct diagnostic of its semantic markedness. Let's consider the case of personal pronouns in Tonkawa, a linguistic isolate spoken in Texas and New Mexico. In Tonkawa, dual number is morphologically complex and is made up of two separate morphemes: a singular base and a plural prefix attached to it. We can represent this as follows: Tonkawa Dual Pronoun = PL prefix +SG base. For instance, the first-person dual geuca-ya is made up of the singular base –*ya* and a plural prefix *geuca-* attached to it. In contrast to a one-way dual/plural syncretism observed in Slovenian nouns, the Tonkawa ual shows a two-way syncretism with both the singular and plural. The dual is syncretic with the singular as it shares the same singular base –*ya* or –*la*, and it is also syncretic with the plural as it shares the same plural prefix *geuca- wena-,* or *'awe-* (Hoijer 1933, 122).

As the above data from Slovenian and Tonkawa show, morphologically, the dual patterns both with the singular and the plural. Why would we expect such morphological patterning and how can we explain it in a principled way? What are the formal properties of the dual as a natural class that it shares both with the singular and plural?

Dual morphology in classical Arabic provides further challenges for understanding the linguistic structure of languages with a singular–dual–plural number system. Aside from the fact that root-and-pattern morphology of Arabic is complex, the distribution of dual forms across different tenses, aspects, and persons makes Arabic a challenging yet perfect example for the study of the dual. For instance, in the imperfective aspect of the verbal conjugation of the verb *k-t-b* ("write"), we can make the following observations about the distribution of dual morphology. First, the dual is marked by the suffix –*aani* in the majority of forms in the verbal paradigm. Second, the dual is absent in the first-person singular (its absence is marked by the * symbol) as there is no form **?-aktub-aani* "We two write" that we would expect. Third, there is no gender distinction between masculine and feminine in the second-person dual; therefore, there is no second dual feminine form for *"You two

(fem) write" (Noyer 1997). Why would there be such morphological gaps in the dual inflection in classical Arabic?

Consider one more example from classical Arabic. If we look at the perfective aspect of the verb *k-t-b* ("write"), we can observe the following patterning of dual forms. The third-person dual *katab-at-aa* (b) is formed from the third-person singular form *katab-at* (a) by adding the dual suffix *–aa*. In contrast, the second-person dual *katab-tum-aa* (e) is formed from the second-person plural *katab-tum* (f). The data below show that the dual in classical Arabic patterns with both the singular and the plural (Noyer 1997). What are the reasons for the different ways of patterning of dual number in classical Arabic?

Besides inflectional morphology, dual number can be also encoded by the so-called constructed dual forms. The constructed dual consists of a combination of two grammatical categories that do not match in their number marking. This mismatch in number marking between the two elements gives rise to dual meaning of an entire constructed dual form. To my knowledge, constructed duals are found only in three native American languages: Hopi (Uto-Aztecan) spoken in Arizona; Zuni, a linguistic isolate spoken in New Mexico; and Kawiisu (Uto-Aztecan) spoken in California.[3] In Hopi, the constructed dual is made up from a plural pronoun and a singular verb. We can represent this as follows: Hopi Sentential Dual = PL Pronoun + SG Verb. As we can see in (1b), dual interpretation of a verbal predicate is morphologically encoded by a plural pronoun *puma* and a singular verb *wari*. We also observe a two-way singular/dual and dual–plural syncretism as the dual shares the singular verb *wari* with the singular and the plural pronoun *puma* with the plural.

(1) Hopi (Uto-Aztecan)
    a. Pam taaqa **wari.**   **Singular =** SG Pronoun + SG Verb
       that man-SG run.SG.PERF
       'That man ran.'
    b. **Puma** taaqa-**t wari.**   **Dual =** PL Pronoun + SG Verb
       those man-PL run. SG.PERF
       'Those two men ran.'
    c. **Puma** taa-taq-**t** yuʔtu.   **Plural =** PL Pronoun + PL Verb
       those RED.man-PL run.PL.PERF
       'Those men ran.'

(Noyer 1997, 181)

The reverse of the constructed dual on a sentential level can be seen in the constructed dual form of some Hopi nouns.[4] We can think of the Hopi

nominal dual as follows: Hopi Nominal Dual = SG N + PL inflection. That is, to express dual number, a singular stem *taaqa* "man" is combined with the plural suffix *–t* to produce *taaqa-t* "two men" (1b). The data from the Hopi constructed dual show a two-way morphological syncretism: singular/dual and dual/plural. Hopi provides yet another example of the dual's unique property to pattern both with the singular and the plural.

At the level of syntax, formal syntactic realization of dual number signals that it is an active grammatical category in a language with a singular–dual–plural number system. When noun phrases or pronouns in the dual are grammatical subjects, they trigger number agreement marked on verbs, adjectives, particles, and other agreeing elements. For example, in Upper Sorbian (West Slavic), dual reference of the pro-drop/non-overt grammatical subject in the first-person dual form *dźěłamoj* "(we) two work" is marked on the verb by the agreement suffix *–moj*. The required presence of dual agreement morphology in a language with the dual indicates that dual number is active in the grammar of that language.

Dual number is a true cross-linguistic phenomenon and is represented in a number of languages from different language families, such as Indo-European, Afro-Asiatic, Eskimo-Aleut, Papuan, Kiowa-Tanoan, Austronesian, and some linguistic isolates. We have seen that the dual exhibits a number of interesting semantic, morphological, and syntactic properties. Could we explain these properties of the dual if we analyzed it from a diachronic perspective? In this book, I focus on the evolution of dual number in Slavic languages and address the properties of the dual discussed above from a diachronic perspective.

1.2 THE EVOLUTION OF THE SLAVIC DUAL: FROM PROTO-SLAVIC TO THE PRESENT

It is well known that languages with a singular–dual–plural number system are less common than the ones which make a singular–plural distinction. Interestingly, many languages with dual number evolved over time into languages with the singular–plural number system. This leads to a natural question as to what linguistic factors contributed to the loss of dual number as a grammatical category in these languages. This is the main question which I explore in detail in this book analyzing the loss of dual number in Slavic languages.

Slavic languages provide a unique gateway into the history of dual number since they derive from the Indo-European language family, which had dual number as a robust and stable grammatical category. Over time, some Slavic languages kept the dual while others changed to singular–plural number

Table 1.1 Classification of the Slavic Languages

Proto-Slavic	South	Eastern	[Old Church Slavic]
			Bulgarian
			Macedonian
		Western	Serbian
			Croatian
			Slovenian
			Bosnian
			Montenegrin
			Slavomolisano
	West	**Czech/Slovak**	Czech
			Slovak
		Sorbian	Upper Sorbian
			Lower Sorbian
		Lechitic	Polish
			Kashubian
			Silesian
	East		Russian
			Ukrainian
			Belorusian
			Rysun

system. To understand how dual number has evolved in different Slavic languages, we must first consider its status in the grammar of Proto-Slavic, which emerged approximately between 2000 and 1500 BC (Sussex and Cubberley 2006, 17).

Proto-Slavic, as did all Proto-Indo-European languages, had three grammatical numbers: singular, dual, and plural (Sussex and Cubberley 2006, 222). However, approximately in the fifth century AD, as Proto-Slavic began to split into three branches—South, West, and East, the dual began to show its first signs of decline as the three branches started to develop into distinct Slavic languages, such as Russian, Ukrainian, Slovenian, Bosnian, Serbian, Bulgarian, Macedonian, Slovak, Polish, Czech, etc. (table 1.1).

Since the time of Proto-Slavic, historical development of dual number in Slavic languages has diverged into two different paths. While the majority of Slavic languages have lost dual number over time, Slovenian (South Slavic), Upper Sorbian (West Slavic), and Lower Sorbian (West Slavic) have retained the dual as a distinct grammatical category.[5]

(2) *Slovenian*
    Midva/vidva/onadvahodi-**va/-ta**   v šolo.
    1.DU/ 2.DU/3.DU go-1.DU.PRES/2.3DU.PRES   to school
    'We/you/they two go to school.'

                                    (Derganc 2003, 171)

(3) *Upper Sorbian*
  a. Ha **mój** **smój** wostał-oj tam
     and 1.DU be.1.DU.PAST stayed- DU there
     'And we two stayed there.'

<div align="right">(Scholze 2007, 125)</div>

  b. **wój stej** najbóle skók
     2.DU be.2.DU most jump
     'You two are the fastest.'

<div align="right">(Scholze 2007, 124)</div>

(4) *Lower Sorbian*
  a. **Mej** se derje znajo-**mej**
     1.DU REFL well know-1.DU.PRES
     'We two know each other well.'

<div align="right">(*Maminorečna Doldoserbšćina*, Corpus of Spoken Lower Sorbian)</div>

  b. **Wej** se znajo-**tej** sowieso.
     2.DU REFL know-2.DU.PRES anyway
     'You two know each other anyway.'

<div align="right">(*Maminorečna Doldoserbšćina*, Corpus of Spoken Lower Sorbian)</div>

As the examples above (2–4) show, Slovenian, Upper Sorbian, and Lower Sorbian have preserved morphologically distinct forms of dual pronouns. Important for the theory of diachronic change of the Slavic number system, which I propose in this book, is the fact that dual pronouns in both Slovenian and Sorbian have a complex morphological structure. They are bimorphemic and consist of two separate morphemes: a plural pronominal stem and the numeral *two* (*dva*) in Slovenian or a dual suffix –*j* in Upper and Lower Sorbian.

Slovenian dual pronouns *midva, vidva,* and *onadva* shown in (2) are composed of two distinct morphemes: plural pronominal stems *mi, vi,* and *ona* for the first, second, and third persons and the numeral *dva* (two). Agreement with dual subjects is expressed on the verb by the suffixes –*va* in the first person and –*ta* in the second and third persons. In the structure of the Slovenian dual, the numeral *dva* ("two") is quite transparent while the Upper and Lower Sorbian dual suffix -*j* (3–4) makes us question its historical origin. Since both contemporary Upper and Lower Sorbian come from Old Sorbian as their ancestor language, it is reasonable to assume that the dual suffix –*j* derives from the Old Sorbian numeral *dwaj* (two).[6]

In Upper Sorbian shown in (3a–b), the first- and second-person dual pronouns *mó-j* and *wó-j* are composed of plural stems *mó/wó* and the dual suffix *–j*. Agreement with the dual subject is indicated on the verb by the suffixes *-moj* in the first person and *-tej* in the second/third persons. In Lower Sorbian shown in (4a–b), the first- and second-person dual pronouns *me-j* and *we-j* are identical in their morphemic composition to their Upper Sorbian counterparts. The Lower Sorbian dual pronouns consist of a plural stem *me/we* and the dual suffix *–j*. The pronouns *mej* and *wej* convey dual reference which is marked on the verb by the suffixes *-mej* for the first person and *-tej* for the second and third persons.[7]

To date, contemporary Slovenian, Upper Sorbian, and Lower Sorbian are the only three Slavic languages which have preserved the dual as an independent grammatical category.[8] In these languages, the status of the dual as a distinct grammatical category (as opposed to the singular and plural) is supported by the presence of agreement suffixes on the verb. Dual pronouns agree in person and number with their respective verbal predicates. In Slovenian, dual subjects are marked with the suffixes *-va/-ta* (2). In Upper Sorbian, dual referents are marked by the suffixes *-moj*, *-tej* while in Lower Sorbian they are encoded by the suffixes *-mej*, *-tej* (3–4).

As a result of historical evolution, Slavic languages exhibit two patterns of diachronic change in the category of number marked on personal pronouns and nouns. Slovenian, Upper Sorbian, and Lower Sorbian are characterized by a singular–dual–plural number system while the rest of the Slavic languages distinguish only between the singular and plural (5).

(5) **Two Patterns of Diachronic Change in the Slavic Number System**
     1. singular–dual–plural   Slovenian, Upper and Lower Sorbian
     2. singular–plural   Majority of the Slavic Languages

The issue of the loss and preservation of dual number in Slavic languages has been a puzzling question for linguists since the late nineteenth century. Although the Slavic dual has been studied by a number of linguists (Belič 1899; Iordanskij 1960; Žolobov 1998; Krys'ko and Žolobov 2001; Derganc 1988, 1989, 2003; Jakop 2008, 2010, 2012; Nevins 2011; Marušič and Žaucer 2018), the two different patterns of diachronic change shown in (5) have not been adequately explained.

1.3 MORPHOSYNTACTIC FEATURE ECONOMY: A NEW THEORY OF DIACHRONIC CHANGE

The current investigation aims to explain diachronic changes in the Slavic number system from a biolinguistic perspective which has not been

previously done. In this book, I examine the evolution of dual number in Slavic languages and propose a new theory of diachronic change driven by the principle of Morphosyntactic Feature Economy. I argue that the principle of Morphosyntactic Feature Economy which I propose is a biolinguistic factor which is responsible for diachronic change in the Slavic dual.

I assume the frameworks of Distributed Morphology (Halle and Marantz 1993; Harley and Noyer 1999), Biolinguistic Minimalism (Chomsky 2001, 2005, 2008a, 2013, 2017; Berwick and Chomsky 2011, 2016), and biolinguistics (Lenneberg 1967; Jenkins 2000, 2011, 2013; Boeckx and Grohmann 2007; Chomsky 2000, 2008b; Boeckx and Grohmann 2013; DiSciullo et al. 2010; DiSciullo and Boeckx 2011; DiSciullo and Jenkins 2016; Fujita and Boeckx 2016). While I specifically focus on the evolution of dual number in Slavic, the principle of Morphosyntactic Feature Economy can be extended and applied to other languages.

The principle of Morphosyntactic Feature Economy which I propose in the book is set up within a biolinguistic approach to language development and evolution.[9] There are two key assumptions that are of importance here. First, from the perspective of biolinguistics, human language is viewed as a biological and organic system similar to any other natural organism found in nature (Lenneberg 1967; Chomsky 2005, 2008a, 2008b, 2000c, 2013; Berwick and Chomsky 2011, 2016; Di Sciullo and Jenkins 2016).[10] Second, human language is considered to be an optimal computational system. It is computational because speakers are able to create an infinite number of sentences or expressions using a finite set of grammatical rules. Language is also characterized as an "optimally designed" system since it strives to utilize the least complicated and most economical pathways in its internal architecture (Chomsky 2013, 41).

Crucial to understanding how the principle of Morphosyntactic Feature Economy predicts and explains diachronic change are the "three factors in language design" that govern the development and growth of language: (1) "genetic endowment," (2) "experience," and (3) "principles not specific to the faculty of language" (Chomsky 2005, 6).

The first factor is a cognitive genetic endowment or a special cognitive capacity of the human brain which allows a child to acquire any particular language effortlessly and without instruction. The second factor is a specific linguistic input from a child's immediate language environment that parents, caregivers, and the society at large provide. The third factor includes principles of computational efficiency that are completely external to the human ability to produce language. These "third factor" principles of computational efficiency are not specific to human language. They are also known in biology, mathematics, chemistry, physics, and other natural sciences as "the laws of growth and form" which constrain any organic system in terms of its optimal growth, development, and evolution (Turing 1952; Turing and Wardlaw 1953; Thompson 1992).

In biology, the application of the strategies of optimization and efficiency in biological pattern formation was shown by Alan Turing (1952). Turing suggested that in nature, biological patterns arise due to the application of physical laws via "spontaneous molecular diffusion and the optimization of overlapping morphogenetic gradients" (Piattelli-Palmarini 2017, 436). Turing and Wardlaw (1953) further suggest that any living organism is "a special kind of system to which the general laws of physics and chemistry apply."

With regard to language, the role of "laws of form" was first noticed by Eric Lenneberg who noted that "the evolutionary process underlying language is analogous to the geometric transformations of form, described by D'Arcy Thompson" (Lenneberg 1967, 265). Following Turing's, Thompson's, and Lenneberg's insights, the factors of optimization and optimality were applied and explored in linguistics in the Minimalist framework (Medeiros 2008; Medeiros and Piattelli-Palmarini 2018). In the domain of syntax, Medeiros (2008) and Medeiros and Piattelli-Palmarini (2018) suggest that X-schema of syntactic hierarchical structure might be an emergent property governed by the "third factor" principles or "laws of growth and form," specifically by the Fibonacci sequence.

In this book, I propose that Morphosyntactic Feature Economy is a "third factor" biolinguistic principle of derivational and computational economy which constraints the evolution of the Slavic dual as a grammatical category.[11] I formulate the principle of Morphosyntactic Feature Economy as follows (6).

(6) **Morphosyntactic Feature Economy**: Optimize a Morphosyntactic Representation of the dual at Morphological Structure before its Spell-Out.

Simply put, Morphosyntactic Feature Economy makes the linguistic structure of the dual more computationally optimal. Morphosyntactic Feature Economy operates on the formal features of the dual within an abstract linguistic derivation and restructures them to achieve optimality of linguistic form. Application of the principle of Morphosyntactic Feature Economy makes the Slavic dual less semantically marked, less computationally burdensome, and consequently more economical.

1.4 GOALS OF THE BOOK

There are three goals which I pursue in this book. The first goal is to trace back the evolution of the Slavic dual pronouns and verbal agreement from the eleventh century to the present and identify two different patterns of diachronic change which occurred in the Slavic languages. I show that the loss

of the dual in the majority of the Slavic languages and its "renewal" in Slovenian, Upper Sorbian, and Lower Sorbian are instances of linguistic reanalysis.

The second goal is to investigate the reasons for linguistic reanalysis of the Slavic dual. I argue that in situations of marked (both semantically and morphosyntactically) categories, such as the Slavic dual, Morphosyntactic Feature Economy prompts younger generations of speakers to reanalyze a cognitively burdensome and computationally inefficient representation of the dual as a simpler and more computationally efficient one. As a result of historical reanalysis, speakers of the majority of the Slavic languages replaced the pronominal dual with a less marked plural whereas speakers of Slovenian, Upper Sorbian, and Lower Sorbian invented a new bimorphemic morphological structure, which consists of the plural pronoun and the numeral *two* or the dual suffix *–j.*

The third goal is to show that diachronic change of a grammatical category is rooted in principles of efficient computation which are biologically grounded and are not specific to language as a specialized cognitive system. I assume that principles of efficient computation including Morphosyntactic Feature Economy derive from biology, physics, chemistry, and other natural sciences. I show that evolution of the grammatical category of number follows the natural laws of form and provides further support for a biolinguistic perspective on language evolution.

1.5 MAIN CLAIM AND CONTRIBUTION

This book offers a new theory of language change motivated by Morphosyntactic Feature Economy set in the framework of Distributed Morphology and biolinguistics. It has been noticed that when confronted with language change, learners prefer to acquire linguistic structures that are efficient, simple, and optimal. Explaining language change via such principles of efficient computation and structural optimality (Chomskyan "third factor") is a relatively new approach in diachronic Minimalism and Distributed Morphology. In recent Minimalism, language change has been addressed via various principles and mechanisms of economy, such as "feature economy" (van Gelderen 2004, 2008, 2009a, 2009b, 2000c, 2010, 2011), "feature simplification" Longobardi (2001), "simplicity of representations" (Roberts 2007), "structural simplification" (Roberts and Roussou 2003), and "feature economy" and "input generalization" (Biberauer and Roberts 2017). This book offers an attempt to account for diachronic change via "third factor" principles of economy and optimization in the framework Distributed Morphology which has not been previously done.

The main claim which I put forward in this book is that diachronic change in the Slavic dual can be brought about by two factors working in tandem:

(1) the learner's reanalysis of primary linguistic data and (2) Morphosyntactic Feature Economy. The first factor is the learner's reanalysis of a less economical linguistic structure. By reanalysis I mean the language learner's shift from an "old" linguistic representation to a "new" one.[12] This shift involves structural changes in an abstract underlying structure of a grammatical category that is reanalyzed. The second factor includes Morphosyntactic Feature Economy which constrains language change by optimizing and restructuring marked and less economical grammatical categories. I argue that the two factors working together (1) the learner's reanalysis and (2) Morphosyntactic Feature Economy are responsible for changes in the derivational structure of the Slavic dual.

The contribution which this investigation makes to linguistic theory is twofold. First, from a theoretical perspective, Morphosyntactic Feature Economy, as a theory of language change, has a number of advantages. It offers an explanation of language change that has a biological foundation and does not appeal to any theory-internal or language-specific filters, hierarchies, or dependencies of previous approaches. More importantly, analyzing language change from a biolinguistic perspective allows us to create a more interdisciplinary approach to understanding language as a complex cognitive and biological system and bridge the gap between theoretical linguistics and other branches of scientific study, such as biology, physics, chemistry, genetics, and psychology to name a few.

Second, on an empirical level, the theory of Morphosyntactic Feature Economy has a significant predictive power and its predictions are borne out not only in Slavic but also in other typologically different and genetically unrelated languages. Specifically, the theory of Morphosyntactic Feature Economy predicts that over time languages with a singular–dual–number system have two options in development: (1) they will either eventually lose the dual as grammatical category, or (2) develop a new and restructured dual. These predictions are borne out in Slavic as the majority of Slavic languages have lost the dual with the exception of Slovenian, Upper Sorbian, and Lower Sorbian which developed a new bimorphemic dual. Besides Slavic, the dual was also lost in Old Icelandic (North Germanic), Old English (West Germanic), ancient Greek (Hellenic), and Old Lithuanian (Baltic).

1.6 METHODOLOGY AND DATA

To date, there are nine research monographs dedicated to the study of the Slavic dual from the diachronic perspective. The first three of them focus on the Slovenian dual: Tesnière (1925), Belić (1932), and Jakop (2008a). The other three include Iordanskij (1960), Žolobov (1998), and Krys'ko and

Žolobov (2001) which analyze the dual in Russian. The last three studies focus on the evolution of the dual in Sorbian (Lötzsch 1965; Ermakova 1970; Unger 1998). Since all of these studies had been done before digital corpora became available, they are restricted in the use of a full range of primary diachronic data due to the lack of availability of data for researchers.

This book aims to fill in the gaps of the previous studies and presents new diachronic data dealing with Slavic dual pronouns and verbal agreement suffixes obtained from the digital corpora of medieval Slavic manuscripts. Diachronic data which I analyze in this book span the time period from the eleventh century to the present. Since my focus is on the development and evolution of the Slavic dual, the majority of data come from Old East Slavic, Old Church Slavic, Old Sorbian, Old Slovenian, and Kashubian.

Throughout the book, I use the following terms to describe certain points in the historical development of Slavic languages. I use the term Old East Slavic to refer to the language spoken by the East Slavic people in the time period between the eleventh and fourteenth centuries.[13] I assume that Old East Slavic comprised various dialects and vernaculars that Eastern Slavs spoke (Lunt 1975; Lunt 1988/1989). Old Church Slavic is used to refer to the written literary language of the Orthodox Slavic culture during the tenth and eleventh centuries (Lunt 2001; Sussex and Cubberley 2006; Xaburgaev 1986). As it is well-known, Old Church Slavic is the language of the earliest Slavic translations (excluding the *Ostromir Gospel* [1056–1057]) of the biblical literature from Greek which was pioneered by the Moravian Mission (863–885) of Constantine-Cyril and Methodius. It is important to note that Old Church Slavic does not represent any specific Slavic regional dialect, but "a generalized form of early Eastern-Balkan Slavic" (Lunt 2001, 1).

I use the term Old Sorbian to refer to the written literary language dating to the sixteenth century which emerged during the time of the Protestant Reformation when biblical literature was translated from German into Sorbian. Before the sixteenth century, the Sorbian language was not written down and existed as a variety of local dialects spoken by the Sorbs, Slavic tribes that lived in Lusatia (currently Eastern Germany). The earliest Sorbian manuscripts which appeared in the sixteenth century reflect both Upper and Lower Sorbian varieties (Ermakova 1966). One of the earliest Sorbian manuscripts is Miklawuš Jakubica's translation (1548) of the *New Testament* which reflects the features of Lower Sorbian (Ermakova 1966, 244; Lötzsch 1970, 118; Igartua 2005, 295). Another early Sorbian manuscript, *Catechism*, translated by W. Warichius in 1597 reflects the features of Upper Sorbian (Ermakova 1970, 243). Both Jacubica's *New Testament* (1548) and Warichius' *Catechism* (1597) are some of the key texts in understanding the historical development of Sorbian language.

The term Old Slovenian is used here to refer to the Slovenian language spoken in the sixteenth century. In the sixteenth century, during the period of Reformation, Slovenian was getting established as a literary language as the first translations of the Bible were made into the Slovenian language by Protestant writers. In 1584, Jurij Dalmatin was the first among the Protestant writers to translate the Bible into Slovenian. This historical manuscript is one of the key texts in the history of Slovenian language that helped shape Contemporary Standard Slovenian.

In this book, I present new diachronic data dealing with dual pronouns and verbs mainly from Old Church Slavic and Old East Slavic manuscripts, such as *The Codex Marianus* (eleventh century), *Savva's Book* (eleventh century), *The Ostromir Gospel* (1056–1057), *Izbornik* (1076), *The Archangel Gospel* (1092), *The Simonov Gospel* (1270), and three chronologically different versions of *the Old East Slavic Primary Chronicle* (*Povest' Vremennyx Let*). These versions are *The Laurentian Codex* (1377), *The Ipat'ev Codex* (ca. fifteenth century), and *The Radziwiłł Codex* (ca. 1490). These three versions of the *Old East Slavic Primary Chronicle* have never been previously analyzed to the extent achieved in this book. By analyzing these three chronologically different versions of *the Old East Slavic Chronicle,* I show how dual forms in Old East Slavic have evolved over time. All of the Slavic manuscripts analyzed in this book are listed in (7).

(7) **Slavic Manuscripts**
     Old Church Slavic
     The Codex Marianus (*Mariinskoe Evangelie*) (eleventh century)
     Sava's Book, first and second parts (*Savvina Kniga*) (eleventh century)
     Old East Slavic
     The Ostromir Gospel (*Ostromirovo Evangelie*) (1056–1057)
     Savva's Book (*Savvina Kniga*) the second and third parts (eleventh century)
     Izbornik (1076)
     The Archangel Gospel (*Arxangel'skoe Evangelie*) (1092)
     The Simonov Gospel (*Simonovskoe Evangelie*) (1270)
     The Čudov Apostle (*Čudovskaja Rukopis'*) (1355)
     The Primary Chronicle from the Laurentian Codex (*Povest' Vremennyx Let po Lavrent'evskomu Spisku*) (1377)
     The Primary Chronicle from the Ipat'ev Codex (*Povest' Vremennyx Let po Ipat'evskomu Spisku*) (ca. middle of the fifteenth century)
     The Primary Chronicle from the Radziwiłł Codex (*Povest' Vremennyx Let po Radzivillovskomu Spisku*) (ca. end of the fifteenth century)
     Old Slovenian
     Dalmatin Bible (*Dalmatinova Bibilija*) (1584)

Old Sorbian
Jakubica's New Testament (Lower Sorbian) (1548)
Lower Sorbian (nineteenth century)
Bramborski Serbski Casnik (1848–1880)

In my analysis of the Slavic dual, I employ the method of corpus analysis and have particularly used morphological analyzer as a tool to identify instances when dual pronouns and dual verbal agreement suffixes occurred in relation to the plural. Using digital corpora, I have constructed Old East Slavic and Old Church Slavic pronominal and verbal paradigms and used them to track down changes in the Slavic dual.

Diachronic data used throughout the book are obtained from the following digital corpora (8). Old East Slavic data come from *Project Manuscript*, an expansive digital corpus of Slavic manuscripts developed by Russian computational and historical linguists launched in 2005.[14] Old Church Slavic data come from the *USC Parsed Corpus of Old South Slavic,* a parsed and annotated digital corpus of Old South Slavic manuscripts developed at the University of Southern California.[15]

(8) *Digital Corpora of Slavic Manuscripts*
Old Church Slavic
The parsed corpus of Old South Slavic manuscripts, University of Southern California http://www-bcf.usc.edu/~pancheva/ParsedCorpus.html
Old East Slavic
Project Manuscript (www.manuscripts.ru), the Iževsk State Technical University, the Russian Ministry of Education and Science.
Lower Sorbian
Doldoserbski Tekstowy Korpus (Corpus of Lower Sorbian Texts)
http://www.dolnoserbski.de/korpus/?rec=de
Maminorečna Doldoserbšćina (Corpus of Spoken Lower Sorbian)
http://www.dolnoserbski.de/dobes/

Access to the key Old Slovenian diachronic data (dating to the sixteenth century when Slovenian was getting established as a literary language) is not yet possible due to the lack of available and reliable digital corpora. In my analysis of diachronic changes in the dual in Slovenian, I had to rely on secondary sources as key diachronic texts are not transformed into digital corpora yet. For example, *Dalmatin Bible* (1584), one of the earliest translations of the Bible from German into Slovenian, is not available as a digital corpus.[16]

Unfortunately, some of the earliest Sorbian manuscripts dating to the sixteenth century, such as Miklawuš Jacubica's *New Testament* (Lower Sorbian) (1548), *Albin Moller´s Songbook and Catechism* (Lower Sorbian) (1574), or

Wenzeslaus´ Warichius' *Catechism* (Upper Sorbian) (1597) are unavailable as online corpora yet. One of the Lower Sorbian texts dating to the nineteenth century, *Bramborski Serbski Casnik* (1852), was accessible to me through the Doldoserbski Tekstowy Korpus (Corpus of Lower Sorbian Texts) developed by the Sorbian Research Institute. Data from Contemporary Standard Lower Sorbian were obtained from *Doldoserbski Tekstowy Korpus* (Corpus of Lower Sorbian Texts) and Maminorečna Doldoserbšćina (Corpus of Spoken Lower Sorbian). It is my hope that in the near future, digital diachronic corpora will be developed to study and preserve such highly endangered West Slavic languages as Upper and Lower Sorbian.

1.7 STRUCTURE OF THE BOOK

The book is structured as follows. Chapter 2 introduces the problem of the loss and preservation of the dual in Slavic languages and presents two patterns of diachronic change. I discuss the evolution of the Slavic dual as a grammatical category and present my research hypotheses regarding its diachronic trajectory. I outline the principle of Morphosynatctic Feature Economy which I propose and explain how it accounts for the two patterns of diachronic change observed in the Slavic dual. I briefly discuss my theoretical assumptions and frameworks.

In chapter 3, I discuss the relevant typological approaches to the classification of the world's languages with dual number and identify the place of the Slavic dual within these typologies. In chapter 4, I outline the architecture of language grammar in the frameworks of Distributed Morphology and Biolinguistic Minimalism assumed in the book. I further demonstrate how a formal morphosyntactic representation of the Slavic dual is derived in these frameworks. I argue that the Slavic dual, as a marked and less economical grammatical category, is subject to restructuring via morphological repairs triggered by Morphosyntactic Feature Economy.

In chapter 5, I analyze how the Slavic dual can be understood in terms of formal number features in a linguistic theory of natural number. I show how number features compose to deliver the semantics of dual number in the East, South, and West branches of Slavic languages. I analyze the morphological composition of the dual across the three different branches of Slavic languages both synchronically and diachronically. I further demonstrate how formal features account for the cross-linguistic variation in the morphological composition of the dual in Slavic languages.

Chapter 6 addresses the why and how questions of the evolution of the Slavic dual over time and seeks to uncover the reasons for diachronic change in general. Why does the Slavic dual exhibit two different patterns

of diachronic change? How could these and any other patterns of diachronic change be predicted and accounted for in a linguistic theory grounded in biological foundations of language?

In chapter 7, I draw conclusions about Morphosyntactic Feature Economy, its role in language change, and its implications for linguistic theory. I suggest that language change is a result of biological, language-independent economy principles, such as Morphosyntactic Feature Economy, which optimize any non-economical linguistic representations. Evidence from the diachronic development of the Slavic dual provides further insight into the internal architecture of language, as well as biological and cognitive principles that guide its growth and development.

NOTES

1. Linguistic variation in the expression of number does not stop with a three-way singular–dual–plural system. There are languages which can mark three, four, a few, more than a few, and many people, objects, or entities. Number systems of such languages include a trial (three), a quadral (four), a paucal (a few), a greater paucal (more than a few), and plural (many). See Corbett (2000) for an in-depth typological survey of number systems in the world's languages.

2. The dual can also be encoded by inverse marking. See Harbour (2008) for details on inverse marking in Kiowa.

3. See Hale (1997) for the original data and discussion of the constructed dual in Hopi. Also, see Noyer (1997), Harley and Ritter (2002), Cowper (2005), Nevins (2011) for formal theoretical analyses of number systems in the world's languages.

4. Not all Hopi nouns are formed by means of the constructed dual. Other animate and inanimate nouns distinguish between singular, dual, and plural number which is expressed by morphologically distinct suffixes. See Jeanne (1978) for more details on the Hopi number system.

5. In many of the contemporary Slavic languages, morphological residues of dual number can be detected in noun stems and suffixes when nouns are modified by paucal numerals 2, 3, and 4. Paucal forms in Russian, Ukrainian, Polish, Bulgarian, Molise Russian, and so on are good examples of the traces of the dual.

6. See Schaarschmidt (1998) and Scholze (2007) for more details on the development of the dual suffix *–j* in Sorbian.

7. The third-person Upper and Lower Sorbian dual pronouns *wona-j* and *wone-j* are also bimorphemic. They consist of a plural pronominal stem *won* and the dual suffix *–j.*

8. In detailed studies on the development and use of the dual in Contemporary Standard Slovenian and its dialects, Jakop (2008, 2012) reports that although the dual remains a staple of grammar in the standard language, its dialectal use has been steadily declining. Nevins (2011) also suggests that the dual is disappearing in Ljubljana Slovenian.

9. A biolinguistic approach to language change used in this book can be applied regardless of any particular theoretical framework.

10. To be precise, in Chomsky's Biolinquistic Program, language is considered to be a "particular object of the biological world" which is specifically unique to humans as opposed to animals (Berwick and Chomsky 2011, 19; Berwick and Chomsky 2016; Hauser, Chomsky, and Fitch 2002).

11. Although I argue for a biolinguistic explanation of language change, I do not rule out other possible factors, such as language contact that could have contributed to the loss of dual number. For example, a close proximity of Slovenia to Austria and Italy and contact with German and Italian (both languages without dual number) might have influenced the eventual loss of dual number in Slovenian. Likewise, close contact with German might have influenced the evolution and loss of the dual in Sorbian. The role of language contact in grammaticalization and language change has been extensively discussed by Heine and Kuteva (2005). The role of Italian in the evolution of number system and numerals in Molise Slavic has been addressed by Breu (2013).

12. The term *reanalysis* in historical linguistics is somewhat of a misnomer in that a learner analyzes primary linguistic data in the input for the first time rather than reanalyzes these data again. Since this term has been traditionally accepted in historical linguistics, I will be using it throughout the book.

13. Delimiting the historical period of Old East Russian (eleventh to fourteenth) is consistent with major researchers' timelines (Lunt 1975; Zaliznjak 2004). Lunt (1975) uses the term *Rusian* to refer to the language of early Rus' of that period. Zaliznjak (1987, 2004) uses the term *drevnerusskij jazyk* to refer to the language spoken by the Eastern Slavic people in the time period between eleventh and fourteenth centuries.

14. I would like to express my enormous gratitude to Dr. Viktor Baranov, the director of *Project Manuscript* and professor at the Iževsk State Technical University for his help with providing access to the diachronic digital corpora of Old East Slavic and Old Church Slavic texts.

15. I am very grateful to Dr. Roumyana Pancheva for her help and assistance with the USC parsed corpus of Old South Slavic manuscripts.

16. A digital corpus, *IMP Language Resources for Historical Slovene,* contains a number of Slovenian historical texts dating mostly to the eighteenth to nineteenth centuries (http://nl.ijs.si/imp/index-en.html). Unfortunately, it has only a sample corpus of Dalmatin Bible (1584). Hopefully, a full-text corpus of Dalmatin Bible will be developed soon.

The Problem of the Slavic Dual
from a Diachronic Perspective

2.1 THE PROBLEM OF THE SLAVIC DUAL AND PATTERNS OF DIACHRONIC CHANGE

> The fate of the dual number in Slavic languages has not been analyzed enough to even get a remote idea of how the dual, which was so consistently used in Old Church Slavic and still used in some of the contemporary Slavic languages, completely disappeared in the other Slavic languages.
>
> А.И. Беличъ (1899)

The diachronic changes in the Slavic dual, although well documented, have been a puzzling problem for linguistic theory since the nineteenth century. There are two diachronic patterns of change which are attested in the Slavic pronominal dual (9). In Slovenian, Upper Sorbian, and Lower Sorbian, dual pronouns were reanalyzed as a new bimorphemic structure (9a). In the rest of the Slavic languages including Russian and Kashubian (analyzed in this book), dual pronouns were lost and replaced by the plural (9b).

(9) Two Patterns of Diachronic Change in the Slavic Dual
    a) dual → reanalyzed dual   Slovenian, Upper and Lower Sorbian
    b) dual → plural   Russian, Kashubian, and the rest of Slavic languages

The morphological structure of dual pronouns in Contemporary Slovenian, Upper Sorbian, and Lower Sorbian is quite transparent. Dual pronouns in these languages are bimorphemic; they consist of a plural pronominal stem (*mi-*, *wó-*, *we-*) and the numeral *dva* ("two") or the dual suffix *-j* (10–13). Old

East Slavic, the ancestor of Contemporary Standard Russian used to have dual pronouns, but over time they were lost and replaced by the plural as Contemporary Standard Russian forms attest (cf. 13–14).

(10) Contemporary Standard Slovenian
      Mi-dva bo-**va** šl-**a** po levi poti, **vi-dva** pa po desni.
      1.PL.two be.1.DU.FUT go.PRT-DU.MASC on left road, 2.PL-two and on right
      "The two of us will take the road on the left while the two of you the one on the right."

                                                          (Derganc 2003, 169)

(11) Contemporary Standard Upper Sorbian
      Wó-j stej najbóle skók
      2.PL-DU be.2.DU most jump
      "You two are the fastest."

                                                          (Scholze 2007, 124–125)

(12) Contemporary Standard Lower Sorbian
      We-j how sejźi-tej a pijo-tej?
      2.PL-DU here seat-2. DU and drink-2. DU
      "You two sit here and drink."

                                                          (*Maminorečna Doldoserbšćina*,
                                                          Corpus of Spoken Lower Sorbian)

(13) Old East Slavic (eleventh century)
      Ꙁ ᲁ ᲀ ᲂ ᲀ ᲀ ᲀ ᲀ ᲀ ᲀ
      ne boi-**ta vy** sę
      NEG fear-2.DU.IMP 2.DU.NOM REFL
      "Don't be afraid you two."

                                                          (Project Manuscript, Ostromir
                                                          Gospel (1056–1057), 203)

(14) Contemporary Standard Russian
      Vy gljadi-**te** v oba.
      2.PL look-1.PL.IMP in both
      "You, beware."

   In Slovenian and Sorbian, the development of structurally novel bimorphemic dual pronouns was descriptively addressed as an innovation, but the

underlying reasons for such an innovation remain undiscovered (Tesnière 1925; Belić 1932; Derganc 1988, 1998, 2003; Jakop 2008, 2012). In Russian, the loss of dual number in the pronominal and nominal domains was extensively addressed by Iordanskij (1960), Žolobov (1998), Žolobov and Krys'ko (2001) who all suggested that dual forms were gradually replaced by the plural. Žolobov (1998) and Žolobov and Krys'ko (2001) further attribute the loss of the dual in Russian to its morphological and semantic markedness. However, a principled account explaining why the Russian dual was marked, and which factors contributed to its eventual loss, was not identified in the previous accounts. The question of why the Slavic dual exhibits two different patterns of diachronic change stated in (9) remains to be answered in the present study.

Slavic number system has inherited its structure from its Proto-Indo-European roots. Like Proto-Indo-European, Proto-Slavic had three numbers—singular, dual, and plural both for nouns and pronouns (Sussex and Cubberley 2006, 222). In both its nominal and pronominal paradigms, the Proto-Slavic exhibits distinct forms for all three numbers—singular, dual, and plural. Since the current study focuses on the evolution of the dual in the pronominal domain, it is important to consider the state of dual pronouns in Proto-Slavic. Pronominal dual forms are robust and distinct for all three persons with instances of case syncretism (Sussex and Cubberley 2006).

Approximately in the fifth century AD, as the Proto-Slavic began to split into three branches—West, South, and East Slavic, the dual underwent a series of diachronic changes (table 2.1). In the East Slavic branch, the decline of the dual began in the eleventh century which is much earlier than in the South and the West branches. Crucially, a much earlier onset of the loss of the dual is what sets it apart in the East Slavic branch from the South and West branches. In Old East Slavic, the loss of the dual was a long and gradual process which began in the eleventh century and was completed approximately by the fourteenth to fifteenth centuries according to my own analysis of Old

Table 2.1   Stages of the Loss of Dual Number in the East, West, and South Slavic

	East Slavic	*West Slavic*	*South Slavic*
Initial evidence of loss of dual	11th century (Old East Slavic)	16th century (Old Sorbian) beginning of the 20th century (Kashubian)	16th century (Old Slovenian)
Completed change from dual to plural	14th–15th centuries (Russian)	middle of the 20th century (Kashubian)	
Emergence of reanalyzed dual	–	16th century (Old Sorbian)	16th century (Old Slovenian)

East Slavic texts.[1] More precisely, by the fourteenth to fifteenth centuries, in East Slavic, the dual was ousted and replaced by the plural.

It was argued by Žolobov (1998) and Krys'ko and Žolobov (2001) that the replacement of the dual by the plural in East Slavic (specifically in Russian) was due to the markedness of the dual as opposed to the plural. According to these approaches, the dual, as a more marked category, was subsumed by the plural which was less marked. The logic of Žolobov's (1998) and Krys'ko and Žolobov's (2001) argument relies on the semantic notion of the set and subset relations. Since the dual contains only two members {a, b} in its set, it forms a proper subset of the plural {a, b, c} which contains three members. It is easy to see how the dual, as a proper subset of the plural, is subsumed by the latter. As the dual was replaced with the plural, its markedness was eliminated. Such an approach solves the problem of markedness of the dual, but does not explain the reasons behind it. What needs to be addressed are the reasons for the markedness of the dual and the factors and mechanisms which drive the diachronic change from the dual to the plural.

In contrast to the complete loss of dual number in East Slavic, the dual in the South Slavic branch survives only in Slovenian. Before the establishment of Slovenian as a literary language, the dual was still used in Slovenian dialects until the sixteenth century. At that time, the dual begins to show its first signs of instability and undergoes a grammatical transformation in which the numeral *dva* ("two") is added an "old" dual form. Krys'ko and Žolobov (2001, 7) suggest that the survival of the dual in Slovenian dialects might be due to the need to preserve this grammatical feature in a situation of language contact with non-Slavic languages, such as Italian and German.

In the West Slavic branch, the pattern of diachronic change of dual number is similar to its South Slavic counterpart. Old Sorbian used to have dual number in its grammar. However, over time, the dual survived only in two West Slavic languages—Upper and Lower Sorbian. Upper Sorbian is a West Slavic language spoken in eastern Germany in the region of Upper Lusatia with a cultural center in Bautzen (spelt as Budyšin in Upper Sorbian). It is a minority language due to the political and economic dominance of German as the official language of Germany. It is estimated that there are no more than 15,000 native speakers of Upper Sorbian and all of them are bilinguial (Elle 2000).

Compared to Elle's (2000) estimates, the statistics from www.ethnologue.com show a smaller number of native speakers of Upper Sorbian. According to Ethnologue, currently, Upper Sorbian is spoken by 13,300 people. The language is classified as "developing" which means that it "is in vigorous use, with literature in a standardized form being used by some, though this is not yet widespread or sustainable" (www.ethnologue.com).

Upper Sorbian still retains dual number marked on nouns, pronouns, and verbs (Schaarschmidt 2002). The dual is undergoing decline, especially in the main dialects spoken near Bautzen, and it is reported to be completely lost in some southern dialects of Upper Sorbian, such as Rodewitz/Rodecy spoken near Bautzen (Schaarschmidt 2002, 23).

Lower Sorbian, the other West Slavic language which retained dual number in its grammar, is spoken in eastern Germany near the town of Cottbus (spelt Chośebuz in Lower Sorbian). Similar to Upper Sorbian, Lower Sorbian is a minority West Slavic language. In comparison to Upper Sorbian, Lower Sorbian has a lot fewer native speakers. According to Ethnologue, Lower Sorbian is an endangered language spoken by approximately 6,670 people. According to Ethnologue, Lower Sorbian is a "shifting" language in which "intergenerational transmission is in the process of being broken, but the child-bearing generation can still use the language, so it is possible that revitalization efforts could restore transmission of the language in the home" (www.ethnologue.com).

Another minority West Slavic language, which used to have dual number in its earlier historical development, is Kashubian.[2] Kashubian belongs to the Lechitic subgroup within West Slavic languages. It is spoken in the north-west part of Poland near the city of Gdansk. According to Ethnologue, Kashubian is on the brink of extinction; it is classified as a moribund (dying) language used only by community elders (www.ethnologue.com). Currently, no children are acquiring Kashubian as their native language. It is estimated that Kashubian is spoken by approximately 3,000 people (Sussex and Cubberly 2006, 97).

Currently, great efforts are made by the Polish government to revitalize Kashubian as a regional language. According to the Euromosaic Study conducted by the European Commission, in 2002 Kashubian was introduced in the public school system in Poland. It was used as a primary language of instruction in kindergarten and elementary schools. Such language revitalization initiatives carried out by the European Commission (within the European Union) are extremely important not only in regard to Kashubian, but also in regard to revitalization of any endangered minority language spoken in Europe.

2.2 HYPOTHESES OF THE EVOLUTION OF THE SLAVIC DUAL

In this book, I propose a theory of diachronic change motivated by Morphosyntactic Feature Economy. I assume the frameworks of Distributed

Morphology (Halle and Marantz 1993; Harley and Noyer 1999) and theory of number features (Harbour 2011, 2014; Nevins 2011). I argue that the Slavic dual is represented by a marked feature combination—[-singular -augmented] whose markedness should be eliminated. I further propose that there are three hypotheses which can be postulated to account for the diachronic changes in the Slavic dual (15).

(15) **Hypothesis 1:** [-singular -augmented] → [-singular] [-augmented]
       Hypothesis 2: [-singular -augmented] → [-singular]
       Hypothesis 3: [-singular -augmented] → *[-augmented]

According to Hypothesis 1, the marked feature combination [-singular -augmented] of the dual is split into two syntactic terminal nodes—[-singular] and [-augmented]. The [-singular] and [-augmented] features can be realized by two separate Vocabulary Items or morphemes. Hypothesis 1 is borne out. It is empirically confirmed by the pattern of diachronic change in the Slovenian and Sorbian dual pronouns. Both Slovenian and Sorbian dual pronouns (*mi-dva, vi-dva, me-j, we-j*) have a bimorphemic structure. The first morpheme is the plural stem (*mi, vi, me, we*) which is encoded by the [-singular] feature. The second morpheme is the numeral *dva* ("two") or the dual suffix *-j* which is encoded by the [-augmented] feature.

According to Hypothesis 2, the [-augmented] feature is deleted from the marked [-singular -augmented] feature bundle, making the dual less marked. Hypothesis 2 is borne out in all of the other Slavic languages including Russian and Kashubian which underwent a diachronic change from the dual to plural. In Russian and Kashubian, the plural morpheme, which replaced the dual, is encoded by the feature [-singular].

According to Hypothesis 3, the marked [-singular] feature of the dual is deleted from the marked [-singular -augmented] feature combination. As a result, the reanalyzed structure has the feature [-augmented]. This would entail that the dual is reanalyzed as the singular since the semantics of the feature [-augmented] corresponds to referential cardinality 1.

In a formal semantic framework, the [+augmented] feature means that given some predicate *P*, it would pick out a reference set *x* if *x* has a proper subset *y* (16) (Link 1983; Harbour 2008; Nevins 2011). The negative value ("-") of the [augmented] feature means that it picks out a reference set without a proper subset. The only cardinality which does not have a proper subset is number 1. When the [-augmented] feature appears in isolation, without any other number feature, it refers to the referential cardinality of number 1.

(16) Definition of the [+augmented] Number Feature
      [+augmented] = λ P ∃y [P(*x*) ∧ P (*y*) ∧ *y* ⊂ *x*]

Diachronic change from cardinality 2, the dual, to cardinality 1, the singular, is impossible for formal semantic reasons. Therefore, Hypothesis 3 is ruled out. Empirically, no attested language has undergone a historical change from the dual to the singular.

In this book, I test Hypotheses 1 and 2 and argue that these two hypotheses are borne out and supported by the empirical data. To account for Hypotheses 1 and 2, I put forward a new proposal which accounts for diachronic change in terms of economy of morphosyntactic features.

2.3 PRINCIPLE OF MORPHOSYNTACTIC FEATURE ECONOMY AND LANGUAGE CHANGE

I propose a new principle of Morphosyntactic Feature Economy which provides a principled explanation for two different patterns (Hypotheses 1–2) of diachronic change in the Slavic dual. I claim that the principle of Morphosyntactic Feature Economy operates on a morphosyntactic representation of the Slavic dual which is marked and computationally inefficient. Assuming that the Faculty of Language (part of our cognitive system) is designed for optimal computation, I stipulate that the proposed principle belongs to the "third factor" principles of efficient computation (Chomsky 2005, 2008). I formulate the principle of Morphosyntactic Feature Economy as follows (17).

(17) The Principle of Morphological Feature Economy
      A marked [-singular -augmented] feature combination of the dual cannot be realized at Phonological Form without eliminating markedness of its features at Morphological Structure.

As shown in the diagram below, the principle of Morphosyntactic Feature Economy targets a marked [-singular -augmented] feature bundle of the Slavic dual at Morphological Structure before morphosyntactic features are filled with phonological content through Vocabulary Insertion at Phonological Structure (18). There are two ways to make the morphosyntactic representation of the dual less marked and therefore more computationally efficient. One option is to split the marked feature bundle of the dual into two separate

terminal nodes via Fission, which happened in Old Slovenian and Sorbian. The other option is to delete the [-augmented] feature via a morphological repair operation of Impoverishment, which occurred in Old East Slavic and Kashubian.
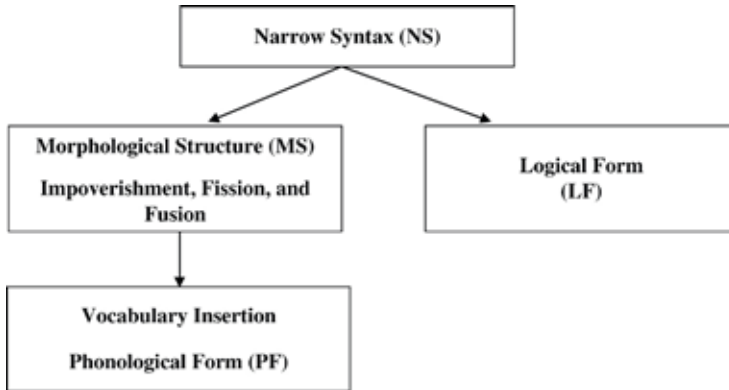
(18) The Principle of Morphological Feature Economy

Morphosyntactic Representation of the Slavic Dual at MS

> **Dual** [-singular -augmented]
>
> [Fmarked Fmarked]
>
> Marked

Morphosyntactic Repairs at MS

Fission   Impoverishment

(Old Slovenian and Sorbian)   (Old East Slavic and Kashubian)

> [-singular] [-augmented]   [-singular]
>
> Less marked   Less marked

Phonological Form
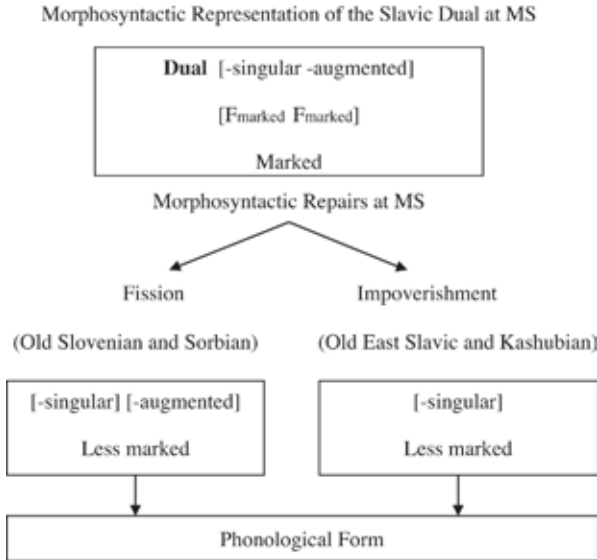
2.4 THEORETICAL ASSUMPTIONS

I assume the architecture of grammar within the theory of Distributed Morphology (DM) developed by Harley and Noyer (1999) (19). In Distributed Morphology, the derivation of a "word" is distributed among three different components of grammar—Narrow Syntax, Morphology, and Logical Form. Narrow Syntax computes hierarchically organized syntactic structure by means of operations Merge and Agree. This syntactic structure is spelled out by the morphological component of grammar, and its meaning is determined by the component of Logical Form. At Phonological Form, morphosyntactic features or feature bundles are filled with phonological material corresponding to roots and affixes.

(19) The Architecture of Grammar in DM (Harley and Noyer 1999)

```
                    ┌─────────────────────────┐
                    │    Narrow Syntax (NS)    │
                    └─────────────────────────┘
                       ↙                    ↘
┌────────────────────────────────┐   ┌──────────────────────────┐
│ Morphological Structure (MS)   │   │      Logical Form        │
│                                │   │        (LF)              │
│ Impoverishment, Fission, and   │   │                          │
│           Fusion               │   └──────────────────────────┘
└────────────────────────────────┘
                │
                ↓
┌────────────────────────────────┐
│   Vocabulary Insertion         │
│                                │
│   Phonological Form (PF)       │
└────────────────────────────────┘
```

In the model presented above, Morphology contains a level of representation called Morphological Structure. Morphological Structure which mediates Narrow Syntax and Phonological Form, is crucial for my proposal. I show that at Morphological Structure a marked feature bundle of the dual is subject to morphological repairs which eliminate its markedness before the dual reaches Phonological Form. Diachronic changes in the Slavic dual pronouns provide empirical evidence for two types of repair operations—Impoverishment and Fission which "simplify" a marked morphosyntactic structure of the dual.

NOTES

1. In their study on the evolution of dual number in Old East Slavic, Krys'ko and Žolobov (2001:209) provide a slightly different date and suggest that the loss of the dual in Old East Slavic was completed by the late fourteenth century.

2. The question of whether Kashubian (also spelt Cassubian) is a language or a Polish dialect is subject to debate. Some linguists (Dejna 1992; Lorentz 1958; Topolinska 1974) consider Kashubian to be a Polish dialect, while others (Breza and Trder 1981; Duličenko 1992, 2005; Hopkins 2001; Stone 1972, 1993; Treder 2006; Zieniukowa 2015) consider it a distinct Slavic language. In this book, I treat Kashubian as a distinct Slavic language.

Chapter 3

The Slavic Dual from a Typological Perspective

In this chapter, my aim is to discuss the relevant typological approaches to the classification of the world's languages with dual number and to identify the place of the Slavic dual within these typologies. I begin with the first typological discussion of languages with the dual proposed by Wilhelm von Humboldt in his famous paper "Űber den Dualis" ("On the Dual Form") (1827). I follow up with a typology of the dual suggested by Otto Jespersen (1965). Then, I outline the critique of Humboldt's typology proposed by Plank (1989), and present further implicational universals concerning the dual suggested by Greenberg (1963), Corbett (2000), and Cysouw (2009). Finally, I present the typology of the Slavic dual proposed by Belič (1899), Iordanskij (1960), Žolobov (1998), and Krys'ko and Žolobov (2001).

3.1 HUMBOLDT'S TYPOLOGY OF DUAL NUMBER

Nach dieser Vorstellung ist der Dualis gleichsam ein Collectivsingularis der Zahl *zwei*, da der Pluralis nur gelegentlich, nicht aber seinem ursprünglichen Begriff nach, die Vielheit wieder zur Einheit zurückfürt. Der Dualis theilt daher, asl Mehrheitsform, und als Bezeichnung eines gescholossenen Ganzen zugleich die Plural und Singular-Natur.

According to this view, the dual is, as it were, a collective singular of the number *two*, since the plural only occasionally, but not by virtue of its original concept, turns plurality back into the concept of oneness. As a form of the plural and at the same time as an indication of a unified whole, the dual form has the nature both of a plural and a singular.

Wilhelm von Humboldt (1827, 9)

29

Wilhelm von Humboldt's pioneering paper "On the Dual Form" (1827) was one of the first attempts to subject the category of the dual to cross-linguistic empirical scrutiny and to present descriptive generalizations about the dual based on his innovative methodology. In contrast to the "holistic" comparative method with a focus on an entire grammar of a language that was used by his nineteenth-century contemporaries, Humboldt's novel methodology was to concentrate solely on one grammatical category, such as the dual, to arrive at a more systematic structural typology of the world's languages.

In his lecture "On the Dual Form" (1927) addressed to the Berlin Academy of Sciences, Humboldt delivered a groundbreaking analysis of the category of dual number examined cross-linguistically. The novelty of Humboldt's approach consisted in the investigation of the dual in its different morphological instantiations in the world's languages and in the examination of the concepts underlying dual forms. Humboldt was convinced that a combination of a thorough empirical analysis of morphological dual forms and the concepts that give rise to those forms would give a new explanation of cross-linguistic differences in languages with the dual and would be key to understanding of the concept of dual number. By using this new method in the realm of comparative language study, Humboldt avoided what he called "a one-sided historical or philosophical" approach to typology since he approached the problem of the dual both conceptually and empirically (1997, 112).

Humboldt's reasoning for studying the dual as opposed to any other grammatical category is worth mentioning. He presents several reasons for his choice. First, Humboldt considers that dual number by itself can be more easily isolated from the grammatical structure of a language since this category is "less deeply rooted" compared to pronouns and verbs which are "so deeply rooted" in the grammatical structure of a language that become more difficult to extract (1997, 116). Second, the dual does not occur in a great number of languages, which narrows down the scope of linguistic investigation.

The third reason for choosing the dual is its diverse cultural geography. As Humboldt states, the dual can be found on the one hand in "uncivilized nations among the Greenlanders and the New Zealanders," and on the other hand in the Attic Greek, a dialect spoken by the most highly educated.[1] The fourth reason for analyzing the dual is its accessibility for cross-linguistic study since one compares a single grammatical category in a variety of languages which allows to investigate "a smaller field" in "the smallest detail" (Humboldt 1997, 117).

Last but not least, Humboldt mentions that the dual as a grammatical category is closely related to the plural. Humboldt argues that due to this relation, the dual should be studied not separately but together with the plural. Humboldt does not carry out a specific investigation of the plural but draws on empirical evidence from languages with restricted and unrestricted plurals

to discover the true nature of dual number. Having presented his reasons for studying the dual, Humboldt concludes his rationale with a final remark that the category of *dual* rather than the category of *number* is a much more focused object of linguistic analysis which allows for the application of pure reasoning and meticulous empirical investigation.

Almost all of Humboldt's aforementioned observations about the dual hold true. However, a few comments are in order. Humboldt makes the insightful observation that dual forms can be easily isolated in morphological systems cross-linguistically. However, for a more comprehensive study of the dual within one language, as well as cross-linguistically, dual forms of nouns cannot be studied in isolation from pronouns and verbal agreement. Such an "isolationist" approach to dual forms would not work for many Indo-European languages, including Slavic, where number and person are fused together in a single morpheme in nouns, pronouns, and verbal agreement.

Humboldt's empirical observation about the rarity of occurrence of dual number in the world's languages and its diverse geography was a remarkable insight. He remarks that the dual occurs in a small number but in a large variety of typologically unrelated language families. These language families include Afro-Asiatic (Arabic, Maltese); Austronesian (Malay, Tagalog, Pampangan, Tahitian); Eskimo-Aleut (Inuktitut); Iroquoian (Cherokee); Saami (Uralic); and Indo-European—Indo-Iranian (Sanskrit, Avestan), Hellenic (ancient Greek), Baltic (Lithuanian), Celtic (Welsh), Germanic (Gothic), and Slavic.[2]

Humboldt's insight that dual is thus very well suited for cross-linguistic comparison is especially important. Putting dual forms to empirical scrutiny cross-linguistically allows one to make crucial generalizations about how the category of number is realized in a variety of languages, and how the concept of number in general is represented in the mind of a speaker.[3] Finally, Humboldt stresses the necessity to analyze the dual in conjunction with the plural since the latter can be further classified into a restricted (paucal for two or several) and an extended plural (many) in some languages which affects conceptual representation of the dual in the speaker's mind.

Humboldt's linguistic typology of languages with the dual is based on three factors: (1) notion (*Begriff*), (2) extension (*Umfang*), and (3) concept (*Vorstellung*). In terms of notions (*Begriffen*), he divides all languages into three classes: (1) languages whose notion of the dual comes from the opposition between the speaker ("I") and the addressee ("You"); (2) languages that derive the dual based on objects found in natural pairs; and (3) languages in which the dual derives not from any kind of phenomenon but from an abstract concept of duality (Humboldt 1997).

In languages of the first class, dual forms are based entirely on the idea of person. Dual forms reflect the opposition between the speaker and the

addressee, namely between the first and the second person. In such languages, dual forms remain tied to pronouns, and depend on whether the first or the second person is attributed more significance. There are some languages where dual forms are restricted only to the first person plural; that is, to the first person inclusive ("we" which includes the speaker and the addressee), whereas other languages make a distinction between the first and the second person in the dual.

Languages of the second class derive dual forms from objects that come in natural pairs. The bilateral symmetry of the human body supplies a number of examples for this class: *eyes, ears, brows, legs, hands*, and all other bodily features that come in twos. In these languages, the dual does not extend beyond nouns that denote natural pairs.

The third class is represented by languages in which dual forms occur in all parts of speech without any restriction. Humboldt assumes that dual forms in these languages derive from an abstract concept of duality. He does not explain how languages of this class have reached this level of abstraction to ascribe dual notions to all parts of speech. One can assume that Humboldt's third class most probably represents the concept of agreement in languages with dual nouns and pronouns. However, Humboldt does not make any explicit reference to agreement per se.

Concluding his "notional" typology, Humboldt remarks that it is quite obvious that languages may belong to more than one of these classes, or to all three classes at once. How is this possible? Humboldt gives an answer to this question with a very important observation about language change. Over time, languages originally belonging to the third class where the dual permeates the entire grammar of the language may retain the dual either in pronouns or nouns, or both, which puts such languages in either the first or second classes, or both.

Humboldt further classifies languages with the dual according to the category of extension (*Umfang*). In this classification, he divides all languages with the dual into three classes: (1) languages whose dual is limited only to pronouns such as some Austronesian languages (Malay, Tagalog, Pampangan) as well as Tamang (Sino-Tibetan) and Chaima (Carib); (2) languages whose dual is restricted only to nouns such as Totonac (Totonacan) and Quechua (Quechuan); and (3) languages in which the dual is present in all parts of speech such as Sanskrit (Indo-Iranian), Arabic (Semitic), Inuktitut (Eskimo-Aleut), and Saami (Uralic) (Humboldt 1997).

Humboldt stresses that classification according to "extension" is based exclusively on his collection of empirical data from languages with the dual. He insists, however, that an accurate typology of languages with the dual must follow from general principles independent of any empirical data. The last Humboldtian observation is particularly important for this book since a theory

of the dual construed from independent principles would allow to explain how the dual is represented in the speaker's mind, and account for directions of diachronic change in languages with dual number. A theoretical framework which is not built on language-specific principles would allow us to account for the emergence and disappearance of dual number cross-linguistically. I hope that this book provides such a theoretical framework which explains the emergence, gradual loss, or retention of dual number in Slavic languages.[4]

After presenting his notional and extensional classifications of the dual—the former based on the emergence of dual notion (*Begriff*) and its corresponding linguistic forms and the latter based on the distribution of dual forms in the world's languages—Humboldt explores how the concept (*Vorstellung*) of dual number is represented in the speaker's mind. This is where Humboldt's remarkable insight about conceptual structure of the dual comes to light.

Humboldt argues that the dual should be conceived as a collective singular realized by the numeral *two* rather than a concept arbitrarily corresponding to the numeral *two*. Humboldt arrives at this concept of the dual by comparing it to the plural. On the one hand, as a collective singular of *two*, a dual can be conceived as a plural in reference to the cardinality of *one*. On the other hand, a dual can be conceived as a singular, which is a unified whole for the cardinality set of *two*. According to such mental representation, the dual has the properties of both the singular and the plural.

This conception of the dual as a collective singular of *two* was an unprecedented theoretical breakthrough that Humboldt presented in his 1827 lecture. Humboldt's conceptual theory of the dual has important implications for current theoretical frameworks in which the dual is treated as a combination of the negative values of the two number features—[±singular] and [±plural] (Hale 1997; Noyer 1997; Harbour 2008, 2011, 2014; Nevins 2006, 2008, 2011).[5] Theories of markedness (Nevins 2011; Harbour 2011) of dual number and its syncretism with the singular and plural naturally follow from such treatment of the dual as having the properties of both the singular and plural.

Humboldt concludes his lecture "On the Dual Form" by making another observation about a conceptual link between the categories of dual number and person. He states that dual as a category of number is absolutely essential to the grammar of language on the one hand. On the other hand, the dual is intrinsically connected to the category of person since the first person plural inclusive is inherently dual. Humboldt provides evidence of pronominal duals in Austronesian (Malay, Tagalog, Pampangan); Sino-Tibetan (Tamang); and Carib (Chaima) language families to show that the cardinality of *two* is tied to the inclusion or exclusion of the addressee in the plural as well as specification of cardinality of *two* in the dual.

The conceptual connection between dual number and person pointed out by Humboldt is of particular importance to this book which investigates in

detail diachronic change in the pronominal dual in Slavic languages. Even though none of the Slavic languages ever had an inclusive/exclusive distinction in the plural, dual/plural syncretism that occurred over time in Slavic languages was essentially tied to the second person.[6]

Both the conceptual and extensional typological classifications of the dual proposed by Humboldt were unprecedented in their intellectual and empirical scope. However, they had some theoretical and empirical limitations. The conceptual classification (table 3.1) identifies different "sources" of dual forms in various languages but does not provide an adequate explanation for abstract duality and its origin in language. Humboldt's extensional classification of the dual is not quite as empirically encompassing as would have been desirable.[7]

More importantly, Humboldt does not observe that the two typologies of the dual show clear correspondences. The conceptual classification of the dual according to the "notion" (*Begriff*) and the extensional classification according to the degree of extension (*Umfang*) of dual forms in a language clearly correspond to each other. Languages of the first notional class which exhibit dual forms due to a distinction between the speaker and the addressee are likely to have pronouns referring to a group of cardinality of two. Languages of the second notional class that have dual forms based on the idea of natural pairs are likely to have nouns referring to a group of cardinality of two. Languages of the third notional class with dual pronouns and nouns will probably have dual marked on all parts of speech. However, Humboldt does not point out these correspondences.

One of the most important implications of Humboldt's conceptual (*Vorstellung*) theory of the dual is its mental representation as a collective singular of *two*. No other comparative scholar of the nineteenth century was able to put forward such a novel understanding of the concept of dual number. In this book, I follow Humboldt's original insight on the conceptual representation of dual number, and its relation to the singular and plural. However, in my theoretical proposal of the principle of Morphosyntactic Feature Economy in the Slavic dual I represent dual number in terms of two morphosyntactic number features—[±singular] and [±augmented].

In his 1827 paper "On the Dual Form," Humboldt was the first to draw linguists' attention to the complexity of morphological, typological, and conceptual aspects of the category of dual number. Humboldt's innovative method combined a thorough empirical investigation of morphological realization of the dual cross-linguistically with an investigation of its conceptual representation. This novel method of linguistic analysis allowed Humboldt to realize empirical and conceptual challenges that dual number poses for both comparative and theoretical linguistics and propose three different typologies of the dual: notional (*Begriff*), extensional (*Umfang*), and conceptual (*Vorstellung*).

Although neither the notional nor extensional classifications of the dual were devoid of some drawbacks that I pointed out earlier, Humboldt's conceptual classification is one of great significance and far-reaching implications. According to his conceptual typology, the dual is represented as a collective singular of the number *two*. This conceptual representation emphasizes that a dual can be understood as singular since it is a unified whole restricted to two entities. At the same time, a dual can be thought of as plural since it denotes *two* entities compared to *one*.

Humboldt's conceptual representation of the dual as both singular and plural allows one to understand the "dual" nature of the dual and test its representation cross-linguistically to discuss linguistic universals concerning number systems. Thus conceived, the dual is no longer considered "an exotic luxury" of some languages but rather a quite natural phenomenon that languages had in the past and continue to have in the present (Humboldt 1997, 136).

3.2 JESPERSEN'S TYPOLOGY OF THE DUAL

Number might appear to be one of the simplest natural categories, as simple as "two and two are four." Yet on closer inspection it presents a great many difficulties, both logical and linguistic.

Otto Jespersen (1965, 188)

At the beginning of the twentieth century, the problem of typological classification of languages with a dual was approached by a Danish linguist, Otto Jespersen. As opposed to Humboldt, Jespersen tried to incorporate the idea of linguistic change into his typology of languages with a dual. Jespersen observed that nominal duals cross-linguistically were not immune to diachronic change. Some languages with nouns denoting natural pairs employed plural marking instead of the expected dual, whereas other languages preserved dual marking for natural pair objects. The concept of diachronic change in nominal duals was captivating for Jespersen who tried to capture it in his typology.

Jespersen (1965) divides all languages with a nominal dual into two classes: (1) those where a dual is used to refer to duality of *two* referents, and a plural is used to mark natural pairs whose duality is semantically obvious; and (2) those where the dual only is used to mark objects naturally found in pairs.

Jespersen observes that many living languages with a nominal dual, such as Inuktitut, mark the duality of two objects by using a distinct dual suffix but indicate duality of natural pairs such as *eyes, arms, ears, etc.* with a plural marker. He does not explicitly state whether plural instead of the dual marking in Inuktitut nouns denoting natural pairs is a result of diachronic

change.[8] In the majority of Slavic languages, plural marking ousted dual in nouns that refer to natural pairs. For example, dual suffixes marked on nouns denoting natural pairs were replaced with the plural in Russian, Belorussian, Ukrainian, Polish, Czech, Slovak, Bulgarian, Macedonian, Slovenian, and some dialects of Upper Sorbian (Stone 1993, 614; Sussex and Cubberley 2006, 225).

Jespersen notes that many extinct languages, such as ancient Greek and Sanskrit, as well as languages in earlier stages of their development, such as Old Lithuanian, preserved a dual marker for naturally paired objects but lost it in subsequent stages of language change. Regarding living Indo-European languages, Jespersen observes that only Sorbian and Slovenian continued to preserve the dual in their grammar. There is a degree of ambiguity in this observation. If it refers to duals of "regular" (not natural pairs) Slovene and Sorbian nouns, it is quite true that they have morphologically distinct suffixes in the dual. If this comment is directed toward duals of paired nouns, it does not hold true as stated earlier.

In contrast to Meillet (1924) who considered the disappearance of the dual as a movement from a "primitive" mentality to more abstract thinking, Jespersen views linguistic change as simplification in the grammar. He regards reduction of any unnecessary distinctions, such as the dual, as a progressive phenomenon. Jespersen states that is hard to show in detail a causal connection between the loss of the dual and advancement of civilization where it was used. For example, he notes that the Greek dual was kept the longest in continental Greece while it was lost in the colonies where the civilization was more advanced.

Jespersen remarks that the use of dual forms can be quite restricted. He notes that in Greek dual forms were used for poetic reasons. For example, in Homer's works dual forms are quite frequent although they are "an artificial archaism" (Jespersen 1965, 206). Some Old Germanic languages, such as Gothic, also exhibit restricted distribution of the dual. In Gothic, pronominal dual is found only in the first and second person.

Despite the lack of a principled explanation for the loss of dual in many Indo-European languages, Jespersen makes an insightful observation about different "traces" of dual number that are left behind. In some languages, an "old" dual form tends to be syncretic with the plural such as in Old Norse, whereas in others, it is syncretic with the singular, such as in Russian (cf. 18–19). As Jespersen (1965, 207) notes, the Old Norse pronoun *Þau* was a dual form which was also used as a plural (20). In Old East Slavic, the suffix *-a* used to be a dual inflection marked on nouns with *a, *ja stems. In Contemporary Standard Russian, a former dual suffix *-a* is a genitive singular of masculine nouns modified by quantified DPs with paucal numerals *dva, tri, četyre* (two, three, four) (21).

(20) Old Norse
Þau
"they two"

(Jespersen 1965, 207)

(21) Contemporary Standard Russian
dv-a mužik-a
two-DU.MASC.NOM peasant- SG.MASC.GEN
"two peasants"

Jespersen's contribution to the problem of classifying languages with dual number is significant in that he tried to capture the phenomenon of diachronic change in his linguistic typology. The disappearance of the dual in many Indo-European languages was well noted by Jespersen but was left unaccounted for. Since Jespersen's typology focused only on nominal duals but did not consider pronominal duals, it had no predictive power to account for linguistic change in a wide variety of Indo-European and non-Indo-European languages. In addition to his typology of nominal duals, Jespersen made a remarkable observation about dual/plural and dual/singular syncretism, but his typological framework could not account for it.

3.3 PLANK'S TYPOLOGY OF THE DUAL: HUMBOLDT REVISITED

Humboldt's (1827) typological classifications of the dual remained influential in the realm of typology and comparative linguistics. However, his classifications were devoid conceptual and empirical drawbacks. Some of the problems in Humboldt's classifications of the dual were taken up more than a century and a half later by another German typologist, Frans Plank. Plank's (1989) main aim in critiquing Humboldt's typologies was to test descriptive generalizations about the dual and to propose novel solutions where these generalizations fail.

In what follows, I focus on the following: (i) Plank's revised extensional typology of the dual, (ii) his novel typology of languages with pronominal dual, and (iii) his typology of verbal agreement with dual nouns and pronouns. These three aspects are most relevant to the topic of this book since it investigates diachronic change in the pronominal paradigm and verbal agreement system in the Slavic languages.

Humboldt's original extensional classification of the dual included three classes of languages: (1) with dual pronouns, (2) with dual nouns, and (3) with dual parts of speech. The major drawback of this typology is the lack

of implicational relations that can be established between dual nouns, dual pronouns, and dual agreement forms. Plank (1989) proposes to solve this problem by suggesting a new typology of languages with dual number. The novelty of Plank's approach is in assigning a binary [±] value to each of the three Humboldtian extensional classes: (1) dual nouns, (2) dual pronouns, and (3) dual agreement forms. Bivalence of a feature for each class gives rise to eight theoretically plausible language types with dual number.

Language types (a), (b), and (c) follow from Humboldt's extensional typology, whereas types (ab), (d), (e), (f), and (g) are suggested by Plank (1989). Type (ab) has both nominal and pronominal dual but lacks dual agreement. Plank notes that languages of this type are quite rare, and provides no examples. Type (g) is a complete opposite of type (ab) in that it has dual agreement forms but lacks dual nouns and pronouns. Plank (1989) suggests that type (g) might not have any members entirely, or might be represented by Chamorro (Austronesian) and Hupa (Na-Dene). A theoretically possible type (d) does not have any dual forms in all of the three categories: nouns, pronouns, and agreement forms.

Types (e) and (f) are interesting in that they both have dual agreement but are asymmetric in the presence or absence of dual nouns or pronouns. Type (e) has nominal dual, whereas type (f) has pronominal dual. Type (e) is attested only in two languages: North Semitic Akkadian (extinct) and Eastern Lybian Arabic. Pronominal dual languages of type (f) are more attested than type (e) and include Gothic (Germanic), Siroi and Kewa (Trans-New Guinea), and Dizi (Afro-Asiatic).

In contrast to Humboldt's extensional typology that has three extensional classes, Plank's (1989) typology with eight types provides a more precise account of diachronic change in languages with dual number. Plank (1989) argues that the existence of language types (e) and (f) accounts for diachronic change in the category of number in a way that was impossible in Humboldt's extensional classification.

Recall that in Humboldt's extensional classification, languages of type (c) where dual is marked on nouns, pronouns, and agreement forms could only change to languages of either type (a) or (b) with pronominal or nominal dual but crucially without dual agreement. It is not clear in Humboldt's typology why languages of type of (a) and (b) have no agreement with nominal or pronominal arguments referring to dual number.

In contrast to Humboldt (1827), Plank (1989) suggests that a language of type (c), where dual is marked on all parts of speech, can shift to either type (e) or (f). That is, a language of type (c) while retaining dual agreement could either lose a pronominal dual and become a language of type (e), or it could lose a nominal dual and transfer to type (f). Crucially, languages of both type (e) and (f) keep dual agreement.

Humboldt's typology could not predict a pattern of diachronic change where languages of type (c) could shift to an (e) or (f) type while keeping dual agreement. The reason for that is simple. Humboldt did not recognize that each category—nouns, pronouns, and agreement can have a [±] value. For Humboldt, agreement is monovalent; that is, it has a negative value [-agr]. Plank's typology represents an advance over Humboldt's. It provides a better account of diachronic change since Plank's agreement feature is bivalent [±agr] and can predict that type (c) languages can lose either pronominal or nominal dual while having a positive [+agr] value for dual agreement.

Diachronic change in the category of dual number lends itself for an interesting typological investigation, especially in the Slavic languages where dual number has undergone different changes in different subgroups of Slavic. Following Plank's (1989) typological classification, I propose my own diachronic typology of Slavic languages with dual number (table 3.1). Proto-Slavic (2000–1500 BC–FIFTH AD) was a language of type (c). It had dual pronouns, nouns, and a rich system of verbal, adjectival, quantifier, and numeral agreement. Old Church Slavic was also a type (c) language with dual nouns, pronouns, and agreement forms. All of its South descendants—modern Croatian, Serbian, Bosnian, Bulgarian, and Macedonian, besides Slovenian—eventually lost dual pronouns, nouns, and agreement, and gradually became languages of type (d).

Slovenian is the only representative in the South Slavic subgroup that has remained a type (c) language (table 3.1). It has generally preserved the dual in nouns, pronouns, and agreement forms. The only exception are nouns denoting natural pairs, such as *noge* ("feet"), *roke* ("hands"), and *oči* ("eyes") which occur only in the plural. The remaining of Slovenian nouns have a special dual suffix that signifies two entities. Slovenian pronouns have a most extensive dual paradigm where dual forms are morphologically distinct from the singular and plural. Slovenian agreement forms in verbal inflection also differentiate the dual in the first, second, and third persons.

The majority of West Slavic languages—Polish, Czech, and Slovak—had been originally type (c) languages, but they lost dual number in the course of

Table 3.1 Diachronic Typology of the Dual in Slavic Languages

Language Type	*c (+dual N, +dual Pro, +dual Agr)*	*d (-dual N, -dual Pro, -dual Agr)*
	Proto-Slavic	Croatian
	Old Church Slavic	Serbian
	Old East Slavic	Bosnian
	Slovenian	Bulgarian
	Upper Sorbian	Macedonian
	Lower Sorbian	Russian
		Belorussian

history thus becoming languages of type (d) (table 3.1). Among the languages of the West Slavic subgroup, Upper and Lower Sorbian are the two type (c) languages that have preserved the dual in pronouns, nouns, and agreement forms (table 3.1). In the East Slavic branch, Old East Russian (eleventh century) also started out as a type (c) language. Over time, its East Slavic descendants—modern Russian, Belorussian, and Ukrainian—have all gradually become type (d) languages (table 3.1).

Besides a new extensional typology of languages with the dual, Plank (1989) also proposes a novel typology of languages with pronominal dual based on the person restriction. He suggests that pronominal dual will vary depending on the inclusion or exclusion of the first, second, or third person giving rise to eight theoretical possibilities. This typology of pronominal dual is based on type (a) which is purely pronominal without dual nouns or dual agreement. Types (ab), (c), and (f) are excluded from this typology since they have either dual nouns or agreement in addition to dual pronouns.

Plank (1989) supports pronominal dual typology with empirically attested examples for each language type. While I will not contend empirical validity of all of these examples, I will challenge the Slavic examples as they do not fit in Plank's pronominal typology. Based on my diachronic corpus studies, I provide a different typology of the pronominal dual in Slavic.

Plank (1989) asserts that there are a lot of languages of type (a1) where the dual is not restricted to any person. These languages belong to a diverse genetic pool including Polynesian, Australian, Papuan, Austro-Asiatic, Samoyedic, Chukotko-Kamchatkan, Khoisan, and Indo-European.

In Plank's pronominal typology, languages of type (a2) that restrict pronominal dual to the first person are less numerous. They are represented by Penutian, Siouan, Uto-Aztecan, Pama-Nyungan, Austronesian, Chadic, and Niger-Congo language families. Restriction of the dual to the first and second person as in type (a3) is attested in a now-extinct Gothic (Old Germanic), in Slovenian at some point in its history, and Huavean, Athapascan, and Australian languages. Restriction of the pronominal dual of type (a5) to the second and third person is comparatively rare. There are only three languages that are attested for (a5) type: Classical Arabic, Aleut, and possibly ancient Greek at some point in its history (Plank 1989).

There is only one example of type (a6), an Afro-Asiatic language Dizi, which restricts the dual to the second person. Restriction of the pronominal dual to the third person as in type (a7) is extremely rare. There only two languages that are attested for this type: some varieties of South Arabic and a now-extinct Gulf language, Tunica (Plank 1989).

Among the Indo-European languages in Plank's pronominal dual typology, there are three Slavic languages: Old Church Slavic, Slovenian, and Kashubian whose placement in Plank's typology appears to be incorrect. Based on

Table 3.2 Typology of the Pronominal Dual in Slavic

Pronominal Type	a1	a2	a3
Slavic Languages	Slovenian Upper and Lower Sorbian	Kashubian	Old Church Slavic
	1st Dual ✓	1st Dual ✓	1st Dual ✓
	2nd Dual ✓	2nd Dual **No**	2nd Dual ✓
	3rd Dual ✓	3rd Dual **No**	3rd Dual **No**

diachronic data from the corpus analysis of Old Church Slavic manuscripts, I propose a different typology of the pronominal dual in Slavic (table 3.2).

Plank claims that Old Church Slavic belongs to type (a1). However, this claim is disproven by my diachronic corpus studies. As my analysis of the Old Church Slavic manuscripts showed, pronominal dual in Old Church Slavic is restricted only to the first and second persons. That Old Church Slavic did not have a dedicated third person pronoun is also confirmed by many Slavic scholars (Gasparov 2001; Lunt 2001; Krivčik and Možejko 1985; Xaburgaev 1986; Ivanova 1977).[9] Therefore, an absence of the third person pronoun places Old Church Slavic in type (a3) (table 3.2).

Slovenian is classified by Plank (1989) as a language with pronominal dual of type (a3), where dual number is differentiated only in the first and second persons of its pronominal paradigm. This classification is incorrect since dual number in Slovenian is attested in all three persons in the pronouns (Derganc 1988, 2003; Jakop 2008). Therefore, Slovenian pronominal dual belongs to type (a1) (table 3.2). Kashubian differentiates the dual only in the first person in its pronominal paradigm (Stone 1993:773). Therefore, it belongs to (a2) type but not (a1) as suggested by Plank (table 3.2).

Based on empirical evidence from various languages, Plank (1989, 305) draws the following implicational universal about the person restriction in the pronominal dual:

(22) If only one person does *not* differentiate a dual, it will *not* be the second.

This implicational universal explains why languages of type (a4) are unattested. In type (a4), dual is differentiated in the first and third persons but not in the second. Exclusion of the second person contradicts Plank's universal (22). If only one person does not differentiate a dual, it cannot be the second. In other words, it can either be the first or the third person.

As Plank (1989) argues, restrictions of the dual to the second person-only and third person-only patterns are attested quite rarely in languages. Dizi (Afro-Asiatic) is the only attested language of type (a6) which restricts its pronominal dual to the second person. South Arabic and a now-extinct

Tunica are only two attested languages of type (a7) which have pronominal dual only in the third person. These typological observations allow Plank to conclude that restrictions to the first person are much better attested in a greater number and variety of languages. More precisely, the first person is much likelier to join the second person whenever the pronominal dual is restricted to two persons. Plank (1989, 305) summarizes these observations in the following implicational generalizations:

(23) If only one person differentiates a dual, it will very likely be the first rather than the second and the third (305).

(24) If only two persons differentiate a dual, the first is much likelier to be one of them than the third (305).

Implicational generalization (23) states that when one person differentiates a dual in a pronominal paradigm, the first person wins over the second and third as suggested by Plank's data. Implicational universal (24) suggests that when two persons differentiate a dual, the first person is preferred over the third. Rarity of languages of type (a5) lends support to Plank's universal (24). There are only three languages of type (a5), classical Arabic, Aleut, and ancient Greek where the dual is restricted to the second and third persons.

Plank's typology of pronominal duals reveals a close correlation between dual number and the second person. As universal in (22) states if a language does not differentiate a dual in one person, it cannot be the second person. This universal holds true as evidenced by the absence of any attested languages of type a4. Plank's (1989) typology of pronominal duals confirms that the second person has a special status. The person of the addressee is more "privileged" than the third and less "privileged" than the first. This correlation is reflected in the hierarchy of persons which has also been recognized by other scholars (Benveniste 1971; Jespersen 1965; Forschheimer 1953; Noyer 1997; Corbett 2000).

Plank's universal (22) has special significance for the typology of Slavic languages since the Slavic dual is inherently connected to the second person. The phenomenon of dual/plural pronominal syncretism in Old Church Slavic and Old East Slavic occurs specifically in the second but not in the first or third person.

Earlier, I have presented two typologies proposed by Plank's (1989): (i) an extensional typology of languages with dual number and (ii) a pronominal typology of duals constrained by the person restriction. Now I will turn to (iii) Plank's typology of verbal agreement which is especially relevant for Slavic pronominal agreement.

Plank (1989) notes that another area left unexplored by Humboldt's (1927) work on the dual is in the domain of verbal agreement. Plank argues that

languages of type (c) and (f) in the extensional typology of the dual can be further subclassified into two types according to person restrictions in agreement and pronominal paradigms: (1) languages where all persons in non-pronominal agreement paradigms differentiate a dual from a singular and plural; (2) languages without a dual for any person in their non-pronominal agreement forms, although pronouns themselves differentiate a dual in some or all persons.

As Plank (1989) argues, languages of type (c) and (f) differ according to the person restriction in the pronominal and agreement forms. In languages of type (c) exemplified by Vedic Sanskrit, Old Church Slavic, Ugaritic, Aleut, Tunica, Siroi, and Kewa, all persons differentiate a dual from a singular and plural in agreement forms, whereas not all persons are marked for dual in the pronouns. Languages of type (f), such as some Old Germanic languages, are not marked for dual in any person in their verbal agreement.

Plank (1989, 307) claims that there is an implicational relation between agreement forms and dual number which is formulated as follows:

(25) If a dual, or any other number, is differentiated for a particular person of non-pronominal agreement forms, there will also be a dual, or other number, for this person in pronouns.

This implicational generalization between dual number in agreement forms and pronouns does not hold true as attested by my own diachronic corpus studies of Old Church Slavic (table 3.3). In Old Church Slavic, all persons are marked for dual in agreement forms but only the first and second persons differentiate a dual in a pronominal paradigm (Gasparov 2001; Lunt 2001; Krivčik and Možejko 1985; Xaburgaev 1986; Ivanova 1977). Plank admits a few other exceptions to this universal that occur in Tunica and Aleut but does not recognize that Old Church Slavic and Kashubian analyzed in this book do not follow his typology.

Slovenian, Upper and Lower Sorbian follow Plank's universal (22) since the dual is differentiated in all persons of agreement forms and, therefore, is present in all persons in the pronouns. Kashubian is an interesting example of a West Slavic language with a pronominal dual only in the first person and an absence of verbal agreement with the dual in the second and third persons. Verbal agreement forms make only a singular/plural distinction (Stone 1993, 773, 776). My own typological generalizations about dual pronouns and agreement patterns in Slavic languages analyzed in this book are summarized in table 3.3.

Plank's (1989) revisiting Humboldt's (1827) lecture "On the Dual Form" comes as no surprise. As a nineteenth-century linguist, Humboldt proposed a comprehensive typology of the dual approached from an extensional,

Table 3.3   Personal Pronouns and Verbal Agreement in Slavic

Language	Personal Pronouns	Agreement Forms	Presence of Agreement
Type (c) Old Church Slavic	1st Dual	1st Dual ✓	Yes
	2nd Dual	2nd Dual ✓	Yes
	3rd Dual	3rd Dual ✓	No
Type (c) Slovenian	1st Dual ✓	1st Dual ✓	Yes
	2nd Dual ✓	2nd Dual ✓	Yes
	3rd Dual ✓	3rd Dual ✓	Yes
Type (c) Upper- and Lower Sorbian	1st Dual ✓	1st Dual ✓	Yes
	2nd Dual ✓	2nd Dual ✓	Yes
	3rd Dual ✓	3rd Dual ✓	Yes
Type (c) Kashubian	1st Dual	1st Dual	
	2nd Dual	2nd Dual	No
	3rd Dual	3rd Dual	No

notional, and conceptual perspectives. However, Humboldt did not notice the existence of binary [±] values for each extensional class—dual pronouns, dual nouns, and dual agreement forms. Plank's (1989) recognized the bivalence of each category and proposed eight extensional classes instead of original three.

Another novelty present in Plank's (1989) work is a typology of languages with pronominal dual according to the person restriction. By assigning each of the three persons in a pronominal paradigm a [±] value, Plank further arrived at eight pronominal types which classified a variety of attested languages with pronominal dual marked in different persons. The same bivalent approach allowed Plank to establish a typology of dual pronouns and verbal agreement. Both pronominal and verbal agreement typologies go beyond Humboldt's ideas about the dual due to Plank's breakthrough approach to recognizing bivalence of grammatical categories.

A major drawback of Plank's (1989) typology is an absence of typological correlation between the dual, singular, and plural in a singular/dual/plural number system. In order to establish such a correlation, it is necessary to consider the place of the dual within a singular/dual/plural number system drawing on empirical evidence from a variety of typologically unrelated languages.

Considering the dual in relation to the singular and plural in a singular/dual/plural number system opens up an avenue to discover its conceptual composition. Therefore, the next step in a typological and theoretical investigation of the dual is to recognize bivalence of features that comprise the grammatical category of number, which was successfully achieved by a number of linguists for a wide variety of languages (Hale 1997; Noyer 1997; Harley and Ritter 2002; Cowper 2005; Nevins 2006, 2011; Harbour 2008).

In this book, I take a step further and analyze morphosyntactic representation of the dual in the South, West, and East Slavic languages.

3.4 CORBETT'S CONSTRAINT ON RANGES OF THE DUAL AND PLURAL

Previous scholars (Humboldt 1827; Jespersen 1965; Plank 1989) who proposed different typologies of dual number did take into consideration one very important factor. They did not discuss patterns of constrains on dual number in various typologically unrelated languages. This task was taken up by a British typologist, Greville Corbett, in his seminal monograph *Number* (2000).

In his book *Number*, Corbett (2000) makes three proposals relevant for this book as they relate to dual number in Slavic. The first proposal concerns languages with a singular/dual/plural number system where the dual is constrained according to the Animacy Hierarchy. The second proposal focuses on diachronic change in number systems, particularly on the rise and fall of the dual in various typologically unrelated languages including the Slavic. The third proposal concerns the directional dependencies between number and other morpho-syntactic features, such as person, case, and gender. In what follows, I present these three proposals and explain how they relate to the Slavic dual.

I will briefly outline Corbett's first proposal about the Animacy Hierarchy as a constraint for number systems which include the dual. According to the Animacy Hierarchy, the more "animate" a nominal is, the more likely it is to mark dual. According to Corbett (2000), the top members of the hierarchy—the first and second person pronouns—are more likely to be marked for dual number than the third person, kin, human, animate, and inanimate nouns, respectively.

The reason for Corbett's proposal of Animacy Hierarchy comes from inadequacy of the Number Hierarchy (Greenberg 1963) as a general constraint for possible number systems. Corbett (2000:39) contends that the Number Hierarchy derived from Greenberg's Universal 34 (No language has a trial number unless it has a dual. No language has a dual unless it has a plural (1963:94)) has two problems. The first problem is that the Number Hierarchy does not account for number systems which have a paucal.[10] The second problem is that the Number Hierarchy does not account for languages with facultative (optional) numbers.

While I will not comment on the first reason for rejecting the Number Hierarchy due to the absence of paucal number in Slavic, I will address Corbett's second objection, the Number Hierarchy based on optionality of dual number in Slovenian. Corbett (2000, 43) claims that the Slovenian dual is optional and cites a plural form of the noun *noge* ("legs") where the dual would be

expected. This claim of the optionality of the Slovenian dual is challenged by Jakop (2008, 3) and Derganc (2003:172) who explain that the noun "legs" belongs to a special class of nouns denoting natural pairs which occur only in the plural. In the rest of the Slovenian nouns, the dual is not optional but obligatory. Therefore, the data from Slovenian does not provide support for the inadequacy of the Number Hierarchy.

Regarding the distribution of number values in languages with a singular/dual/plural system, Corbett (2000) proposes a Constraint on Ranges for Different Number Values which governs the ranges for dual and plural numbers. This constraint follows from the Animacy Hierarchy, and predicts two possible patterns of distribution of the dual and plural while ruling out a third pattern of distribution which is not attested. In the first pattern, the ranges of the dual and plural are identical. In the second pattern, the dual has a smaller range than the plural. A language, in which the distribution of the dual is greater than that of the plural is impossible.[11]

Although Corbett's two patterns of ranges of dual and plural descriptively might account for the distribution of Slavic dual vs. plural, they do not explain why the ranges the way they are. It is evident that ranges of the Slavic dual are going to be smaller than those of the plural because (1) the dual is a more marked number value compared to the plural which follows from Greenberg's Universal 34 and the Number Hierarchy; and (2). the dual is used less frequently than the plural.

More importantly, the two patterns proposed by Corbett (2000) do not provide a principled explanation for the direction of diachronic change in the Slavic dual over time. The Constraint on Ranges for Different Number Values does not give a deep theoretical explanation why (1) the Slavic dual was preserved in Slovenian, Upper and Lower Sorbian, and Kashubian, and (ii) why a singular/dual/plural number system in Old Church Slavic and Old East Slavic changed to a singular/plural number system in the majority of their descendant modern Slavic languages.

Corbett's proposal on the rise and fall of the dual is especially relevant to this book. Corbett attributes the rise of dual number in a singular/dual/plural system to the numeral "two" based on the evidence from Lihir (Austronesian) whose dual, trial, and paucal can be traced back to the numerals "two," "three," and "four." Corbett (2000, 267) further strengthens his argument about the source of the dual by citing evidence from Slovenian and Breton which "renewed" their duals by adding the numeral "two."[12]

Slovenian is an extremely interesting example of the "renewal" of the dual in the pronouns. By the sixteenth century, the Slovenian dual was weakened, and the first and second person plural pronouns *mi* and *vi* had begun to be used in dual contexts with dual agreement markers on the verb (Jakop

2008, 57). To resolve the problem of the syncretism (identity of morphological form) between the plural and dual, the dual was "innovated" in the first, second, and third person by the addition of the numeral *dva* ("two") resulting in "new" dual forms.

The loss of the Slavic dual and its morphosyntactic traces in Russian and Serbo-Croatian are well noted by Corbett (2000). Agreement is one area where morphosyntactic remnants of the Slavic dual are especially evident. In Contemporary Standard Russian, noun phrases quantified by the paucal numerals *dva* ("two"), *tri* ("three"), and *četyre* ("four") require a noun to appear in the genitive singular (26). Corbett claims that the genitive singular suffix -*a* dates back to the original dual suffix -*a* used with some Old East Slavic masculine nouns. Corbett's claim is confirmed by my own Old East Slavic data (27). In (27), the Old East Slavic masculine noun *brother*, quantified by the numeral *two*, is marked by the dual suffix -*a*.

(26) Contemporary Standard Russian
      dva brat-a
      two table.GEN.SG.
      "two brothers"

(27) Old East Slavic
      ВИДѢ ДЪВА БРАТА
      vid- ě dǔv-a brat-a
      see-third.PAST two-MASC.DU.ACC brother-MASC.DU.ACC
      "He saw two brothers."

                                        (*The Ostromir Gospel* 60.1)

Corbett (2000) further argues that as in Russian, in Serbo-Croatian, masculine nouns modified by the numerals *two*, *three*, and *four* also appear in a special, so-called count form which is a "remnant" of the dual (28). Similar to Russian, the noun *man* is marked by the genitive singular suffix -*a.* Corbett further notes that attributive modifiers, such as *dobr-a*, are obligatorily marked by the "count form" -*a* via agreement with the noun. The agreement suffix -*a* on the adjective is not the same as the genitive form which might be expected. Corbett concludes that the "count" suffix -*a* on the attributive modifier is due to the presence of the numeral *two.*

(28) Serbo-Croatian
      dva dobr-a čovek-a
      two good-COUNT man-GEN.SG (= COUNT)
      "two good men"

                                        (Corbett 2000, 270)

In sum, Corbett's (2000) observations regarding the morphosyntactic remnants of diachronic changes in the Slavic dual are descriptively correct. However, his proposal, the Constraint on Ranges of Dual and Plural Number cannot account for the direction of diachronic change in the Slavic dual. Corbett's typological observations cannot account for why the majority of the Slavic languages including Russian and Kashubian developed a singular/ plural number system with the exception of Slovenian, Upper, and Lower Sorbian which maintained a singular/dual/plural system.

3.5 CYSOUW: DUAL AS A RESTRICTED GROUP

Cysouw (2009) surveys a great variety of pronominal paradigms in many typologically unrelated languages. His work on number and person marking in pronominal paradigms makes three important contributions relevant for the analysis of the Slavic pronominal dual and verbal agreement in this book. First, Cysouw redefines dual number in the pronominal domain and presents a novel typology of number marking based on the concept of RESTRICTION. Second, he introduces the concept of markedness reversals in number systems of various languages which challenges traditional understanding of this concept in terms of Greenberg's Universal 34: "No language has a dual [number] unless it has a plural" (1963, 94). Third, Slavic languages with duals are shown to fit into a "dual-unified-we" typology (Cysouw 2009, 206).

Cysouw (2009) proposes a novel typology of number marking in the pronominal domain. His new typology of number consists of three categories: singular, group, and restricted group. This typology is derived based on the idea of restriction. Restriction applies to groups which can be restricted either to a minimum number of participants (dual) or to a small number (paucal).

The category group corresponds to the traditional plural. However, as opposed to the traditional understanding of a plural defined by the number of participants involved, for Cysouw (2009), group is defined qualitatively by the kind of participants not by their number. Because a group is not restricted by the number of participants, it is an unrestricted group. Therefore, group is an unmarked category in relation to the restricted group.

The category restricted group corresponds to the traditional dual. In this category, the number of participants is restricted to what is minimally needed; namely, two persons. Thus, the first and the second persons are minimally needed to form an inclusive (including the addressee) dual. The first and the third persons are needed to from an exclusive (excluding the addressee) dual. The category restricted group is more marked than group.

In Cysouw's (2009) typology of number markedness is handled differently from the traditional approach. For Cysouw, there are two unmarked

categories—singular and group—since both are not restricted by number. Restricted group is a marked category since it is restricted by number. Traditionally, singular is an unmarked category in opposition to the plural and dual which are marked.

Cysouw's (2009) understanding of number markedness in the pronominal domain is based on the concept of restriction in that a restricted group is more marked than simply group. However, this interpretation of markedness is not absolute. Cysouw points out three types of markedness reversals: (1) referential, (2) morphological, and (3) structural. Cysouw argues that these three types of markedness reversals provide evidence against a well-established marked status of the dual in relation to non-singular (plural) (Greenberg 1963; Jakobson 1984).

Referential markedness reversal occurs when an unmarked meaning of the restricted GROUP is dual; that is, two persons are meant. A group (plural) referring to more than two persons is marked by adding an extra morpheme. Cysouw cites Navajo (Na-Dene) as an example of referential markedness reversal. In Navajo, the form *nxíh* can be used to mean either dual or plural. To express reference to more than two persons the prefix *da-* is added to express plural (29).

(29) Navajo
    dual/plural   plural
    nxíh   da-nxíh
    "we"   "we, more than two"

                                          (Cysouw 2009, 194)

Morphological markedness reversal occurs when the plural is realized by a more morphologically complex form than the dual. Cysouw provides examples from Nganasan (Uralic), Damana (Chibchan), and Kwamera (Austronesian) to illustrate his point. Morphological markedness of phonological exponents of plural pronouns in relation to dual is not unusual and received a principled explanation within a feature-theoretic framework (Nevins 2006). Nevins (2006) argues that it is crucial to distinguish between markedness of phonological exponents (morphophonological realization) and markednedness of abstract features. According to Nevins's (2006) approach to markedness, morphological complexity of the plural in contrast to less complex dual does not mean that plural forms are more marked. To determine markedness, it is necessary to analyze a morpho-syntactic, featural representation of a dual or a plural form at the level of Morphological Structure.

Structural markedness reversal is most puzzling. It occurs when more structural distinctions are made within the dual than the plural. Cysouw cites

pronominal paradigm of Samo (Trans-Guinea) where more person distinctions are made in the dual than in the plural. Cysouw notes that languages with structural markedness reversals are not numerous. According to traditional observations (Greenberg 1966), I found that in Old Church Slavic, Old East Slavic, Slovenian, Upper and Lower Sorbian, and Kashubian, the dual shows fewer distinctions in gender and case.

Cysouw (2009) proposes a "dual-unified-we" typology of pronominal systems with the dual. The dual-unified-we typology is "the major paradigmatic structure with dual marking but without an inclusive/exclusive opposition" (206). It is claimed to be one of the four most frequent pronominal paradigms in the world's languages (Ingram 1978). Cysouw argues that Proto-Indo-European as well as modern Indo-European languages including Lithuanian and Lower Sorbian are good examples of this typology. Lower Sorbian personal pronouns are shown to have a complete "dual-unified-we" paradigm.

Cysouw (2009) shows that "dual-unified-we" pronominal paradigm is found not only in Indo-European but is attested in a wide variety of the world's languages. For example, it is found in Uralic languages Khanti and Mansi spoken in Siberia. In South-East Asia, Tibeto-Burman languages, Meithei, Kham, Mon-Kher, and Hmong Njua have the dual of this type. Eskimo-Aleut, Trans New Guinea, and Australian languages display the "dual-unified-we" paradigm as well.

3.6 THE TYPOLOGY OF THE SLAVIC DUAL

A Serbian linguist, Alexander Belič, was the first among Slavic linguists to address the typological, morphosyntactic, and diachronic complexities of the Slavic dual (1899). According to Belič (1899), the Slavic dual was classified into three different types. The first type, "free" dual, corresponds to natural pairs of objects, such as body parts. The second type, bound dual, occurs with nouns modified by the numeral *two* or the quantifier *both*. The third type, conjunctive dual, is found with two nouns which are connected by the conjunction *i* ("and") and the verb is marked by a third person dual suffix *-te*.

The first type of dual, the free dual, is characterized by the following examples. The Old Church Slavic nouns *uš-i* ("ears"), *oč-i* ("eyes"), *bok-a* ("sides"), *glaz-a* ("eyes"), *ruts-ě* ("hands"), and *nodz-ě* ("legs") are all marked by the dual suffixes *-i, -a,* or *-ě* depending on the noun declension type. Within the first type of the free dual, Belič also identifies a subtype, a distributive dual, in which the paired noun marked by a dual suffix occurs with a plural noun. The entire nominal phrase has a distributive meaning since the dual meaning of the paired noun is distributed over a number of plural entities. For example, in the nominal phrase, *nodz-ě učeniko-mŭ* ("pairs

of legs belonging to each of a plural number of disciples"), the paired noun *legs* is marked by a dual suffix *-ě*, and the meaning of pairedness is distributed over the plurality of *disciples* (30).

(30) Old Church Slavic
nodz-ě učenik-o-mŭ
leg-DU disciple-TH-PL.DAT
"pair of legs of each of the disciples"

(Žolobov 2001, 17)

The bound dual type also has a subtype, identified by Belič as an anaphoric dual. The anaphoric dual entails an anaphoric relation of the demonstrative pronoun marked by a dual suffix to its antecedent, a syntactic dual subject used in the previous sentence. For example, in the sentence *ta . . . idos-te*, the demonstrative pronoun *ta* appears in the dual number (31).

(31) Old Church Slavic
ta ido-s-te
this.DU.MASC   go-PAST-3.DU
"Those two went."

(Žolobov 2001, 17)

The conjunctive dual, the third type, is further classified by Belič as having a pronominal dual subtype. The pronominal dual has the first and second person pronouns appearing as the syntactic subject and the verb is marked by a dual suffix via agreement (32). The third person dual is not part of the pronominal paradigm of Old Church Slavic.

(32) Old Church Slavic
radui-ta va sę
rejoice-2.DU.IMP 2.DU.NOM REFL
"You two rejoice."

(Savva's Book 123: 9, Math 28.9)

The typological classification of the Slavic dual developed by Belič (1899) has important implications for the diachronic analysis of the Slavic dual presented in this book. Based on Old Church Slavic data, Belič was the first among Slavic linguists to notice that the dual across all types identified in his typology was undergoing gradual replacement by the plural. Belič (1899) came to the conclusion that dual number, as a grammatical category, became

unstable also in the pronominal paradigm of personal pronouns. Belič (1899) suggested that the use of the plural pronouns instead of the dual in Old Church Slavic could be attributed to the "identity of some dual and plural forms" (1190). Despite extensive research of Old Church Slavic manuscripts, Belič (1899) could not give a principled reason for the gradual replacement of dual pronouns by their plural counterparts.

The typology of the Slavic dual proposed by Belič (1899) was further tested and refined by a Russian Slavic linguist, A. M. Iordanskij (1960) in his book *Istorija Dvojstvennogo Čisla v Russkom Jazyke* (The History of Dual Number in the Russian language). Using Old East Slavic manuscripts as his sources of data, Iordanskij (1960) analyzed the loss of dual number marked on Old East Slavic pronouns, nouns, numerals, verbs, and adjectives. Iordanskij's contribution to the study of the historical development of the Slavic dual was in his detailed analysis of the dual in Old East Slavic in contrast to Belič's (1899) focus on the dual in Old Church Slavic. One of the major drawbacks of Iordanskij's (1960) study of the Old East Slavic dual was his reliance on some secondary sources of data, which lead him to make incorrect generalization about the diachronic development and loss of dual number in Russian.

Regarding the diachronic development of the first and second person pronouns, Iordanskij argued that the loss of the dual began well before the eleventh century, and continued throughout the twelfth century (1960, 25). He claimed that the second person dual pronoun *va* was the first one to be replaced by the plural form *vy* (33). This claim is incorrect for two reasons. First, it was not confirmed by my own corpora studies and analysis of the Old East Slavic dual which I present in chapter 6. In all of the Old East Slavic manuscripts which I analyzed in this book including the earliest, *The Ostromir Gospel* (1056–1057), the only second person pronoun which occurred was *vy*, not *va*. Second, the dual verbal agreement suffix *-ta* in (33) shows that the subject still denotes two entities, not many. What we observe in (33) is not a total replacement of the dual by the plural as claimed by Iordanskij (1960) but simply dual/plural syncretism of the form *vy*.

(33) Old East Slavic
      vy ubo nbsĭnaja člověk-a es-ta
      2.PL EMPH heavenly man-2.DU be-2.DU.PRES
      "You two are heavenly men."

(*Skazanie o Borise i Glebe*,
Iordanskij 1960, 17)

Russian linguists O. F. Žolobov (1998) and Krys'ko and Žolobov (2001) conducted a very extensive study of diachronic changes in the Old East Slavic

dual. The main goals of this new study were to correct the shortcoming of Iordanskij's (1960) initial study and to provide a theoretical explanation for the loss of the dual in Old East Slavic. In his studies, Žolobov (1998) and Krys'ko and Žolobov (2001) relied only on primary data from a variety of Old East Slavic manuscripts and birch barks dating from the eleventh up to the fifteenth centuries thus avoiding Iordanskij's (1960) data errors.

Krys'ko and Žolobov (2001) argued that the reason for the loss of the dual could be accounted for in terms of grammatical markedness.[13] He claimed that the Old East Slavic dual was a marked member of the dual/plural grammatical opposition. The dual, as a marked member of the morphological opposition, underwent the process of neutralization and was subsumed by the plural. When the dual was no longer a marked member of the opposition, it became an unmarked type of number within the plural.

Krys'ko and Žolobov (2001) accounted for the loss of the dual in Old East Slavic in terms of its grammatical markedness. However, Krys'ko and Žolobov (2001) did not explain why the dual was a marked category in a dual/plural grammatical opposition. It remains unclear in his analysis what semantic or morphological factors contributed to the grammatical markedness of the dual and its eventual disappearance in Old East Slavic.

3.7 CONCLUSION

In this chapter, I presented typological approaches to the study of dual number cross-linguistically. The first typological classification of languages with dual number began with the pioneering typological work of Wilhelm von Humboldt (1827). In his conceptual typology, Humboldt (1827) proposed a crucial semantic relation between the dual and the singular as well as the dual and the plural. Humboldt's original conceptual representation of the dual as both singular and plural was essential in my proposal of the principle of Morphosyntactic Feature Economy presented in chapter 6.

Humboldt's original typology of the dual was further developed by Jespersen (1965), Plank (1989), Corbett (2000), and Cysouw (2009). Each of these linguists made significant contributions to the typological study of the dual. I explored implications of the proposed typologies in relation to the Slavic dual throughout this chapter.

Finally, I discussed typological approaches to the Slavic dual suggested by Belič (1899), Iordanskij (1960), Žolobov (1998), and Kry'sko and Žolobov (2001). Belič's contribution to the study of the Slavic dual was significant. Working with the Old Church Slavic data, he was one of the first Slavic linguists to recognize that the dual had already been undergoing diachronic change in the eleventh century. As a result of this diachronic change, the dual

was replaced by the plural in some instances in the Old Church Slavic manu-scripts. The dual/plural diachronic change in Old Church Slavic, a member of the South Slavic branch, was also found in Old East Slavic, a representative of the East Slavic branch. In chapters 5 and 6 of this book, I investigate in detail why the dual survived in Slovenian (South Slavic), Upper, and Lower Sorbian (West Slavic), whereas it completely disappeared in Russian (East Slavic) and Kashubian (West Slavic).

NOTES

1. It seems that the term "uncivilized nations" might have been quite appropriate for the nineteenth-century linguistics. It is inappropriate in current linguistic theory and discourse. Its usage, though, does not detract from the main point that Humboldt was making.

2. Humboldt does not discuss any details of the dual in Slavic.

3. This latter point was not originally intended by Humboldt, as he stated himself when presenting his reasons for the study of the category of *dual number* rather than the category of *number*. However, it naturally follows from empirical cross-linguistic generalizations about the dual and its comparison to the singular and plural.

4. The details of my proposal of the principle of Morphosyntactic Feature Econ-omy in the Slavic dual are presented in chapter 6.

5. In Noyer's (1997), Nevins's (2006, 2008, 2011), and Harbour's (2008, 2011) work, the [±plural] feature corresponds to the [±augmented]. Formal semantic defini-tions of the [±singular] and [±augmented] number features are given in chapter 5.

6. Gamkrelidze and Ivanov (1984) present a different view. They propose that PIE personal pronouns and consequently Proto Slavic distinguished two persons—first and second—and two numbers—singular and plural. There was an inclusive-exclusive distinction in the first person plural which developed due to a binary structure of PIE grammatical system.

7. This was likely due to the limitation of empirical resources that were available for Humboldt at that time.

8. One might make an assumption that diachronically the dual got replaced by the plural in Inuktitut nouns denoting natural pairs.

9. Since there is no third person pronoun in Old Church Slavic, demonstrative pronouns were used in contexts referring to third party entities.

10. I adopt Corbett's definition of paucal which refers to "a small number of dis-tinct real world entities" with "no specific upper bound" and whose "lower bound will vary according to the system in which it is embedded" (2000, 22).

11. In the patterns of ranges of the dual and plural, Corbett assumes that "the sin-gular is taken as given, being implied by the opposition with the plural" (2000, 90).

12. Corbett (2000, 268) claims that Breton, has a "new" dual based on the numeral *daou* ("two"). This claim is challenged by Press (1986) who argues that Breton does not have a morphological dual, but simply a derivational form with the meaning

"double" or "a pair of." A derivational form with a dual meaning is formed by adding the numeral "two" only to nouns denoting body parts (1). The reason why Breton does not have a genuine dual comes from the fact that a derived noun *daou*-N can take a plural suffix (2). Therefore, Breton clearly does not have a dual, but rather a bimorphemic derived noun confined to body parts that come in natural pairs.

(1) daou-lagad   Breton
       two-eye
       "eyes'

(2) daou-lagad-où   Breton
       two-eye-PL
       "pairs of eyes'

(Press 1986,71)

13. Kys'ko and Žolobov (2001) did not assume any specific notion of markedness. Perhaps, they followed Jakobsonian tradition regarding morphological markedness.

Chapter 4

Derivation of the Slavic Dual in Distributed Morphology

In this chapter, I present the framework of Distributed Morphology (DM) which I adopt in this book for the formal analysis of dual number in the Slavic languages. I show a step-by-step DM derivation of dual number marked on Slavic nouns, pronouns, and verbs (by agreement), and explain why morphological operations of Impoverishment and Fission, which operate on morphosyntactic representations of the dual at Morphosyntactic Structure, are key for my analysis of diachronic changes in the Slavic dual.

4.1 THE ARCHITECTURE OF GRAMMAR IN DISTRIBUTED MORPHOLOGY

The theory of DM is a syntactic approach to morphology originally proposed by Halle and Marantz (1993), and further refined by Noyer (1997), Harley and Noyer (1999), and Embick and Noyer (2008). In this book, I adopt the version of DM developed by Harley and Noyer (1999). The central architectural premise of DM is that words, like phrases and sentences, have an internal structure whose derivation is syntactic. Syntax is the only component of grammar which generates a syntactic hierarchical structure containing morphosyntactic features of roots and affixes.

DM as an approach to morphology is called "distributed" because the lexical properties of a morpheme—its phonological exponence, morphosyntactic features, and its semantic meaning—are distributed among different components of the grammar, and are not collected together in a single lexical item. In this respect, DM sharply contrasts with a Lexicalist approach to morphology (Lieber 1992; DiSciullo and Williams 1987) which assumes that all of the lexical contents of a morpheme are bound together in one lexical item

represented in the lexicon. DM rejects the idea of a lexical item derived in the lexicon and belonging exclusively to morphology.

In DM, the notion of a morpheme is abstract. According to the model of grammar as proposed by Harley and Noyer (1999), a morpheme is derived at the three levels of representation: syntactic, morphological, and phonological. In the syntax, a syntactic numeration is composed by selecting morphosyntactic features from a universal set of features (e.g., [+past], [Det], [+sg], [Root], etc.) made available by Universal Grammar. Morphosyntactic features combine to form binary syntactic structures via the syntactic operations of Merge, Move, and Copy. By the end of a syntactic derivation, morphosyntactic features are positioned at syntactic terminal nodes in a generated syntactic structure (figure 4.1).

As shown in figure 4.1, at the level of Morphological Structure (MS), morphosyntactic features can be subject to morphological operations of Merger, Fusion, Fission, and Impoverishment which can alter their morphosyntactic structure. After a morphosyntactic structure undergoes any change at MS, it is sent off to the level of Phonological Form (PF) where a phonological
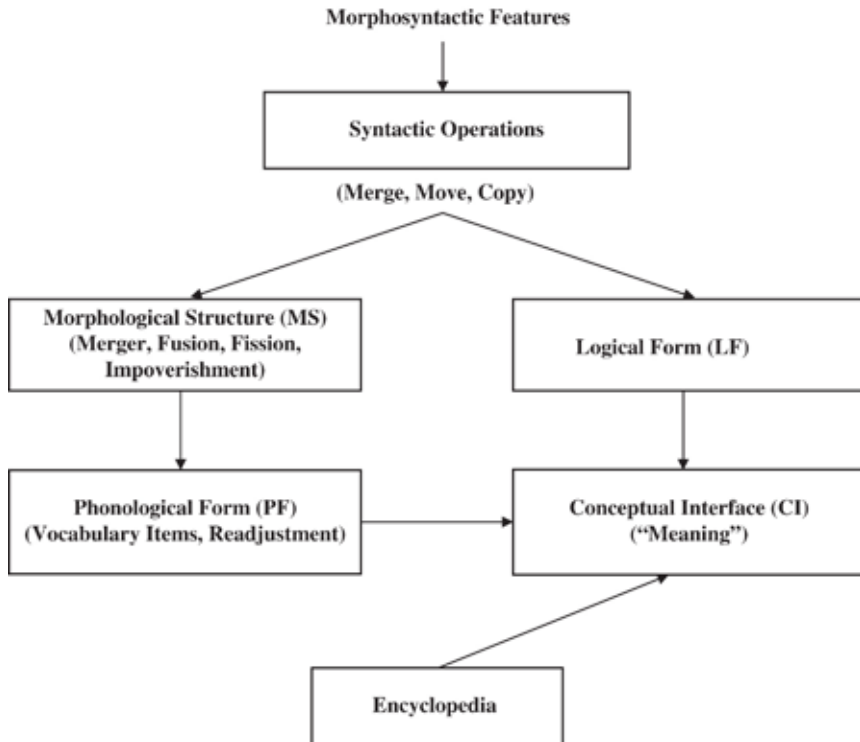

Figure 4.1   The Architecture of Grammar in DM.

exponent supplies its phonological features through insertion of a Vocabulary Item (VI).

Simultaneously, a morphosyntactic structure is also sent off to Logical Form (LF) where its semantic meaning is computed by interpreting a syntactic derivation into which morphosyntactic features enter. A mental Encyclopedia which contains nonlinguistic knowledge about objects and entities in the real world is accessed to obtain nonlinguistic information. Finally, the full semantic meaning of a morphosyntactic structure is established at the Conceptual Interface.

I adopt the three major tenets of DM which set it apart from other theories of morphology: (1) Late Vocabulary Insertion, (2) Underspecification of Vocabulary Items, and (3) Syntactic Hierarchical Structure All the Way Down. The first tenet of DM, Late Vocabulary Insertion, means that morphosyntactic features at syntactic terminal nodes in a syntactic derivation do not have any phonological content, and are "paired" with their Vocabulary Items (VIs) "late" after a syntactic derivation has been composed.

Vocabulary Insertion takes place after syntax at PF, when morphosyntactic features at syntactic terminal nodes are discharged by VIs which fill them with phonological content. A VI is a relation between a phonological exponent (phonological feature matrix) and its context for insertion, which specifies a certain morphosyntactic environment (34). Some examples of VIs are given in (35).

(34) Vocabulary Item
      /phonological exponent/ ↔ context for insertion
(35) Examples of Vocabulary Items
        a). /dva/ ↔ Num [-sg -aug]   numeral *two* in Russian
        b). /vy/ → elsewhere   second person plural pronoun in Russian
        c). /brat/ ↔ [$_{DP}$ [$_D$____]]   root of *brat* ("brother") in Russian

The second tenet of DM, Underspecification of Vocabulary Items, refers to the idea that a phonological exponent of a VI can be underspecified (i.e., does not contain all of the morphosyntactic features that a terminal syntactic node does) relative to a syntactic terminal node into which it is inserted. In contrast to underspecified VIs, morphosyntactic feature bundles (sets) at syntactic terminal nodes are fully specified.

In a realizational model of grammar such as DM morphosyntactic features and phonological exponents are independent of each other. Therefore, there is no need for phonological exponents to carry a full set of morphosyntactic features. Thus, Underspecification of Vocabulary Items follows naturally from the DM architecture of grammar where syntactic terminal nodes, which carry fully specified morphosyntactic features, and

Table 4.1 The Numeral dva ("two") in the Nominative Case in Contemporary Standard Russian

Gender	Suffixes
Masculine	-a
Neuter	-a
Feminine	-e

Vocabulary Items, which realize these features, reside at different grammatical levels—syntax and PF.

A paradigm of the numeral *dva* ("two") in Contemporary Standard Russian is an example of application of the principle of Underspecification of VIs (table 4.1). The Russian numeral *dv-a* ("two") in the nominative case exhibits masculine and neuter gender marked by the same suffix *–a*, whereas feminine gender is marked by the suffix *–e*. Since the same VI /a/ realizes both masculine and neuter gender of the numeral "two," we conclude that the suffix *–a* is underspecified for gender.

The phenomenon where one underspecified VI can be inserted into two or more distinct syntactic nodes represented by different sets of morphosyntactic feature bundles is called syncretism. Underspecification is one way in which syncretism can be derived in DM. As we will see in Section 4.3, Impoverishment is another source of syncretism. According to this definition of syncretism given here, the VI /a/ is an instance of masculine/neuter gender syncretism in the numeral inflection of Contemporary Standard Russian.

Underspecification of the VI /a/ leads to a syncretism when more than one VI can be inserted into the same syntactic terminal node. In the case of the Contemporary Standard Russian numeral *dva*, two VIs are eligible for insertion at the syntactic terminal node fully specified for the feminine gender (36). When two or more VIs are competing for Vocabulary Insertion into the same syntactic terminal node, their competition is resolved via the Subset Principle (37).

(36) Vocabulary Items
      /e/ ↔ [-sg, -aug, +fem]
      /a/ ↔ elsewhere
(37) The Subset Principle (Halle and Marantz 1997, 428)
      Where several VIs meet the conditions for insertion, the item matching the greatest number of features specified in the terminal morpheme must be chosen.

The VI /e/ has three features in its context for insertion, whereas the VI /a/ is completely underspecified; it is a default, or an elsewhere item whose context for insertion is devoid of any features. According to the Subset Principle,

the VI /e/ wins the competition, since its subset has more features fitting the set of features at a syntactic terminal node specified for the feminine gender than that of its counterpart /a/. Thus, the VI /e/ is inserted at a syntactic terminal node which is specified for the feminine gender of the numeral *dve* ("two"). Elsewhere VI /a/ is inserted in the masculine and neuter contexts.

The third tenet of DM, Syntactic Hierarchical Structure All the Way Down, highlights its major premise as a syntactic theory of morphological structure. This hypothesis suggests that hierarchical structure into which root and affixes enter is determined by the syntactic hierarchical structure generated by Merge and Move operating on bundles of morphosyntactic features. It follows that in the default case, syntactic and morphological structures are isomorphic; that is, there is one-to-one mapping relationship between a syntactic terminal node and an affix corresponding to this node.[1]

4.2 DERIVATIONS OF THE SLAVIC DUAL IN DM

In DM, the derivation of a complex morphological object ("word"), which consists of a root and affixes, occurs strictly in the syntax. Since the syntax is the only module of grammar which generates hierarchical structure, the morphological structure of a "word" is simply its syntactic structure.[2] Following Embick and Noyer (2007), I assume that the internal structure of a "word" is represented as a complex syntactic head derived via head movement by adjoining one syntactic head to another one in a successive manner (figure 4.2).

A complex head in (39) has a root (√Root) and several affixes (X, Y, and Z) represented as syntactic heads which are positioned at syntactic terminal nodes in a binary syntactic structure. Each syntactic head has a bundle of fully specified morphosyntactic features, labeled as [F].

The derivation of a complex morphological head proceeds as follows. A syntactically complex head is derived via syntactic head movement (Travis 1984) when one syntactic head adjoins another one through successive
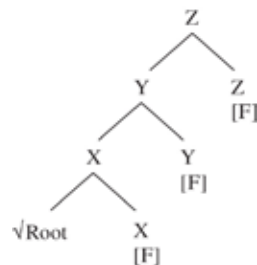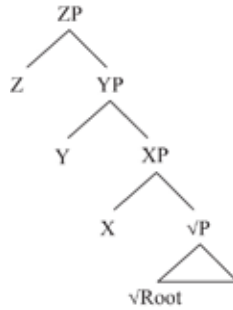

Figure 4.2   Complex Head.

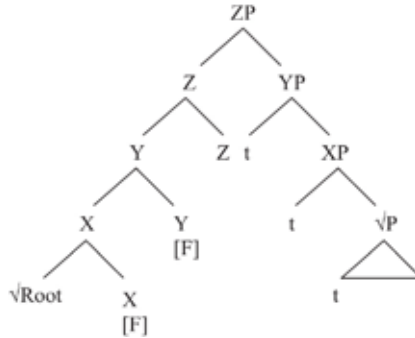**Figure 4.3   Syntactic Structure Before Head Adjunction.**

Figure 4.4   Complex Head After Head Adjunction.

adjunction. The syntactic structure in (figure 4.3) illustrates a complex morphological object ("word") before head adjunction, and the structure in (figure 4.4) shows this "word" after head adjunction.

It is crucial for my analysis of dual number features in Slavic, which enter into agreement relations with verbs and concord relations with nouns, to make explicit assumptions about agreement and case features. Regarding agreement, I draw a clear distinction between *syntactic agreement* and *morphological agreement.* Assuming Minimalist syntax (Chomsky 2001, 2008a, 2008b, 2013, 2017), syntactic agreement occurs between uninterpretable and interpretable features in a syntactic derivation, and is carried out via an operation of feature valuation called *Agree.*

In the framework of DM assumed in this book, *morphological agreement* is a post-syntactic operation implemented via addition of Agreement nodes (AGR) at the level of MS (McFadden 2004; Bobaljik 2008; Embick and Noyer 2007).

Similar to agreement features, I distinguish between *abstract syntactic Case* features and *morphological case* features.[3] In the spirit of Chomsky's (2001,

2008a, 2008b) Minimalist syntax, I assume that unvalued structural Case features present on a DP in a syntactic derivation are valued by the functional heads T and *v*. In contrast to abstract syntactic Case features, morphological case features are added to syntactic terminal nodes at MS, and are consequently spelled-out by VIs at PF (Bobaljik 2008; Embick and Noyer 2007).

Let me first address the distinction between abstract syntactic agreement and morphological agreement. In Minimalism (Chomsky 2001, 2008a, 2008b), syntactic agreement is carried out via an operation *Agree* which assigns values to uninterpretable features of the functional heads T and *v*. Uninterpretable phi-features (person and number) on T and *v* enter a syntactic derivation unvalued. It means that these features have no semantic value and need to be valued ("agree") by interpretable features phi-features (person, number, and gender) of a DP.

An operation *Agree* assigns values to the unvalued phi-features on the heads T and *v*. Once valued, uninterpretable features still have no semantic interpretation, and can cause a syntactic derivation to "crash" at both LF and PF levels. To avoid a potential non-convergence of a syntactic derivation, valued uninterpretable features are deleted at LF before they reach the level of Vocabulary Insertion at PF.

In contrast to abstract syntactic agreement which occurs in narrow syntax, morphological agreement is an operation which applies after the syntax at the level of MS before Vocabulary Insertion at PF. Morphological agreement applies when AGR nodes are added to a complex syntactic head by language-specific rules in accordance with morphological requirements of a particular language.

First, I show how abstract syntactic agreement occurs in a clause according to the Minimalist approach (Chomsky 2001, 2008a, 2008b). Second, I illustrate how morphological agreement applies after syntax at the level of MS. Finally, I focus on the morphological structure of an Old Church Slavic verb bearing dual agreement and show how an AGR node is added to a complex verbal head.

To see how abstract syntactic agreement works, let us take an Old Church Slavic sentence from the Codex Marianus (38). Its syntactic structure is shown in (figure 4.5).
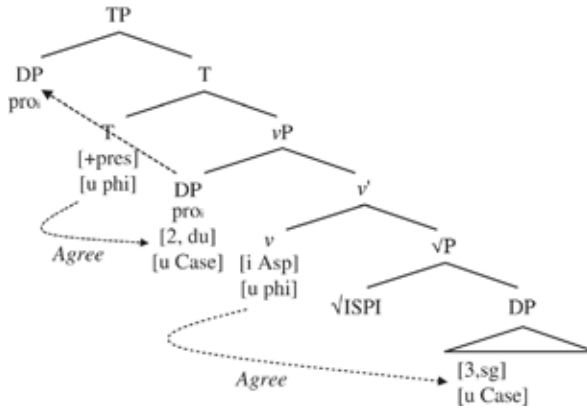
(38) Old Church Slavic
      чашѫ моѭ испиета
      čaš-ę mojǫ ispi-je-ta
      cup-3.SG.FEM.ACC my drink-TH-2.DU.PRES
      "You two will drink all of my cup."[4]

(*Codex Marianus*, Math. 20.23)

Figure 4.5 Syntactic Agreement.

Abstract syntactic agreement, or valuation of uninterpretable features on T and *v* in the syntactic structure (figure 4.6), proceeds in the following way. The functional head T has uninterpretable phi-features—person and number, and an interpretable present tense feature.[5] The uninterpretable person and number features on T have no values, and as such cannot be interpreted at LF or realized at PF.

In order to get valued, the head T with the uninterpretable person and number features probes for the closest c-commanded DP which has interpretable person and number features. The probe T finds its goal, a pro-subject DP, which has interpretable second person and dual number features, and an unvalued structural Case feature. The uninterpretable person and number features of T are matched with the interpretable second person and dual number features of a pro-DP through an operation of feature valuation called *Agree*. Once valued, the uninterpretable features on T are deleted before they reach LF since they cannot be interpreted according to the Principle of Full Interpretation (Chomsky 2001).

The functional head *v* bears uninterpretable person and number features and an interpretable Aspect feature (Asp), which I adopt from Pesetsky and Torrego (2001). Like T, the *v* head probes for the closest c-commanded DP with interpretable person and number features. The probe *v* finds its goal, the object DP with the interpretable third person and singular number features, and an unvalued structural Case feature.[6] The operation *Agree* applies when the uninterpretable phi-features of *v* are matched with the interpretable phi-features of the object DP.[7] For the *v*P phase to be fully interpreted at LF, the valued uninterpretable phi-feature features on *v* are deleted before LF.

In what follows, I show how morphological agreement applies strictly after syntax at the level of MS. Let us focus on morphological agreement of
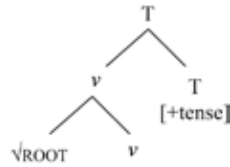
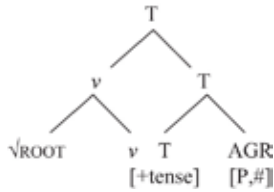**Figure 4.6 Syntactic Structure of a Complex Verbal Head in NS.**

Figure 4.7 Structure of a Complex Verbal Head with an AGR Node at MS.

a "verb." In the syntax, the structure of a "verb," that is, a complex verbal head, contains a √ROOT, a verbalizing *v* node, a Tense (T) node but crucially no AGR node (figure 4.6).

I assume that an AGR node is added after syntax at the level of MS prior to Vocabulary Insertion by a language-specific rule in accordance with morphological requirements of a particular language (figure 4.7).[8] My assumption is generally in line with Embick and Noyer's (2007) views on AGR node adjunction with one crucial difference. For Embick and Noyer (2007), AGR nodes are added at PF before Vocabulary Insertion, whereas I assume that this process occurs earlier at the level of MS before PF in accordance with the model of DM adopted from Harley and Noyer (1999).

To illustrate how an AGR node is adjoined at MS, let us take an Old Church Slavic verb *ispi-je-ta* with a dual agreement suffix *-ta* from sentence (38). The root of this verb *ispi-* is followed by a thematic vowel *–je*.[9] The suffix *–ta* bears the features of present tense, the second person, and dual number of a pro-drop subject. This suffix is an example of a portmanteau morpheme (very common in Slavic) in which tense, person, and number features are fused together in one VI. In the syntax, the Old Church Slavic verb *isp-je-ta* has the structure shown in (figure 4.8). Crucially, the syntactic structure in (figure 4.8) does not have an AGR node.

An AGR node is added to the Tense node at MS by a language-specific rule, which requires that in Old Church Slavic an AGR node must appear on a finite Tense node (39). The rule in (39) introduces an AGR node which at this point in the derivation is featureless as shown in (figure 4.9). I assume that the features of a pro-drop subject are coped onto this AGR node by a feature-copying process at MS (40). In the structure (49), an added AGR node is no
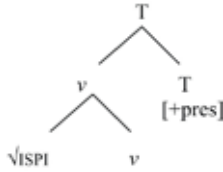
Figure 4.8   Syntactic Structure of the Old Church Slavic Verb ispi-je-ta in NS.

longer featureless but already "acquired" its phi-features, that is, the second person and dual number through feature copying.
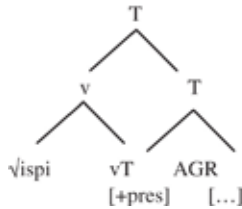
(39) OLD CHURCH SLAVIC Finite T Rule at MS

Figure 4.9   The Structure of the Old Church Slavic Verb ispi-je-ta with a Featureless AGR at MS.

$$\text{T}_{\text{finite}} \rightarrow [\text{T AGR}]$$

(40) Feature Copying at MS
      A phi-feature which is present on a syntactic terminal node in the narrow syntax is copied onto an AGR node at MS.

In (41), an AGR node adjoins to the T head, and makes it possible for an operation of *Fusion* to apply at the level of MS and fuse two nodes together into one before Vocabulary Insertion at PF (Halle and Marantz 1993; Noyer 1997; Embick 2010). The T and AGR nodes are fused into one morphosyntactic object under the sisterhood relation in the syntactic configuration (figure 4.11) by a *Fusion* rule (41). A Fusion rule (41) applies at MS when the T node with [+pres] tense feature and the AGR node with the phi-features [2, du] are fused into one node.
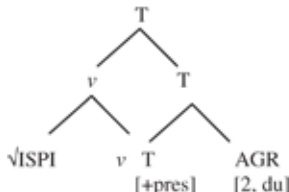

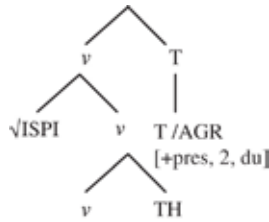**Figure 4.10   The Structure of ispi-je-ta with AGR Features.**

Figure 4.11 The Final Structure of the Old Church Slavic Verb ispi-je-ta at MS.

(41) Fusion Rule for T and AGR Nodes in Old Church Slavic
        [T +pres] ⌐AGR 2 du] → [T/AGR +pres, 2, du]

At the level of MS, the final structure of the verb *ispi-je-ta* looks as shown in (figure 4.11). A theme node (TH) is added to the syntactic structure to host a theme vowel *–je.* At the level of PF, Vocabulary Insertion applies and inserts the following VIs: the root /ispi/, a phonologically null VI /Ø/ for the verbalizing *v* node, a theme vowel /je/, and a single exponent /ta/ for a fused T/AGR node (42).

(42) VIs for the Old Church Slavic verb *ispi-je-ta*
        /ispi/ ↔ /√ ISPI
        /Ø/ ↔ /v
        /ta/ ↔ /[+pres, 2, du]

Now, I turn to the distinction between abstract syntactic Case and morphological case. I will briefly explain the notion of syntactic case features. The subject and object DPs enter a syntactic derivation with unvalued structural (nominative and accusative) Case features as shown in the syntactic structure (figure 4.5). Valuation of unvalued Case features proceeds in the following way. When a subject or an object DP with an unvalued structural Case feature is merged in a syntactic derivation, it makes T or *v* active for an operation Agree to apply and match their uninterpretable phi-features with interpretable phi-features of a DP. Unvalued structural Case features are not features of the syntactic heads T and *v* but are assigned values by T and *v* under operation *Agree.* In the syntactic structure (figure 4.5), the functional head T values abstract nominative case of its pro-subject, and the functional head *v* values abstract accusative case of its DP object.

In contrast to syntactic structural Case valuation which occurs strictly in the narrow syntax, I assume that Kase nodes and morphological case features are absent in the syntactic structure of a "word," and are added after syntax at MS prior to Vocabulary Insertion. Following (Marantz 1991), I assume that Kase nodes are added at the level of MS. As for addition of case features,

Table 4.2   Case Suffixes of an *a-stem Old East Slavic Noun žen-a ("woman")

Number/Case	Nom	Acc	Gen	Loc	Dat	Instr	Voc
SG	-a	-u	-y	-ě		-oju	-o
DU	-ě		-u		-ma		
PL	-y		-ĭ	-xŭ	-mŭ	-mi	

my assumption generally follows Embick and Noyer's (2008) views on post-syntactic addition of morphological case features with one crucial difference. According to Embick and Noyer (2007), morphological case features are added to case/number nodes at PF whereas I assume that addition of morphological case features occurs at a separate level of MS prior to PF.

In what follows, I show how morphological case nodes (K) and case features are added to the syntactic structure of Slavic dual nouns and pronouns. Let us examine the case paradigm of an Old East Slavic "noun" *žen-a* ("woman"). The Old East Slavic noun *žen-a* is feminine in gender and appears in three numbers: singular, dual, and plural. It exhibits six distinct case suffixes in the singular, three case suffixes in the dual, and five case suffixes in the plural (table 4.2).

For clarity of exposition, let us focus on the noun *žen-a-ma* in the dual dative form (43).[10] This noun is composed of the root *žen-*, a thematic vowel *–a*, and the suffix *–ma* which marks dual number and dative case. Old Church Slavic is a language without determiners. Following Perelsvaig's (2007) argument on the universality of the DP projection in determinerless languages, I assume that Old Church Slavic has a DP projection in its noun phrase. In the model of DM (Harley and Noyer 1999; Embick and Noyer 2007) adopted in this book, I assume that syntactic structure of any morphological form of a noun is composed of a root, nominalizing head *n*, a number head (Num)—all dominated by the Determiner (D) head as shown in (figure 4.12).

(43) Old East Slavic
      ρєγє жєнама
      reč-e žen-a-ma
      say-3.AOR woman-TH-3.DU.DAT
      "He told the two women."

                                    (*Ostromir Gospel*, Math. 28.5, 203:5)

As shown in (figure 4.13), in the syntax, the Num head contains the number features [-sg -aug] which specify a dual number in a singular/dual/plural number system of Old East Slavic.[11] Crucially, the syntactic structure in (figure 4.13) does not contain any Kase nodes or morphological case features which indicate the dative case of the noun. This assertion follows from the
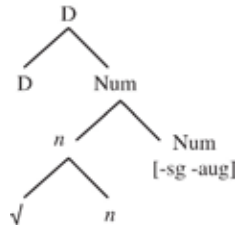
Figure 4.12   Narrow Syntactic Structure of an Old East Slavic Dual Noun žen-a-ma.
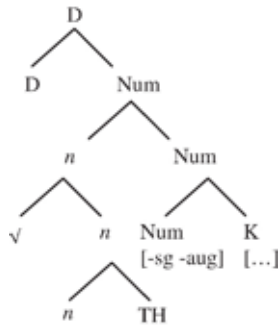

Figure 4.13   Syntactic Structure of an Old East Slavic Noun žen-a-ma with an Adjoined K node at MS.

assumption established earlier that morphological case is a post-syntactic phenomenon; that is, *no* Kase nodes or case features are present in the narrow syntactic computation of a morphological object (Marantz 1991; McFadden 2004; Bobaljik 2008; Embick and Noyer 2007).

After the syntactic derivation in (figure 4.13) is complete, it is subject to operations that add morphological Kase nodes and case features at the level of MS. Following Marantz (1991), I assume that a Kase node headed by K is added to host morphological case features at the level of MS. Since Old East Slavic is language where number and case are fused together in one portmanteau suffix, it is possible for a K head to adjoin to the Num head as shown in (figure 4.13). A terminal node labeled TH is added to host a thematic vowel –*a*, which is inserted at PF.

After a Kase node has been adjoined to the syntactic structure at MS, a level, which mediates narrow syntax and PF, morphological case features can be added to the K node. In order to add case features to the K node, Old East Slavic morphological cases, such as nominative, accusative, genitive, dative, locative, instrumental, and vocative, need to be decomposed into case features.

At this point in the derivation of the dual dative form *žen-a-ma*, three questions arise: (1) Which case features should be added to the K node at MS? (2) Are case features syntactically, morphologically, or semantically motivated? and (3) Are case features language-specific or universal?

The first question raised deals with theoretical approaches to case feature decomposition. Case feature decomposition is not a trivial matter, and has been subject to debate among linguists. There are at least three reasons for this debate. First, motivation of case features is not always clear in the literature and is questionable (Halle 1997; Müller 2004; Franks 2002; Baylin 2004). Second, there is a question of whether case features are language-specific, or universal (McFadden 2004). Third, case categories might not be represented as flat bundles of case features but might have hierarchical structure (Caha 2009).[12]

I argue that case features should not be assigned arbitrary labels simply to capture generalizations about syntactic distribution of case-marked DPs and to describe attested patterns of syncretism in inflectional categories but rather case features should constrain the grammar of a language based on syntactic and semantic grounds. I further claim that decomposition of case features of nominal arguments (pronouns and nouns) is constrained by two factors: (1) by syntactic configurations in which DPs appear and (2) by their argument structure; that is, by the semantic roles that DPs bear with respect to their predicates. I sum up my claim about how case features are determined in (44).

(44) Determination of Case Features Criterion
       Case Features are determined by two factors:
         1) The syntactic configuration in which a case-marked DP appears.
         2) The argument structure of a DP within a verbal predicate.

I follow Jakobson's (1984, 1985) fundamental insight that morphological cases are not atomistic, that is, that cases are not defined in terms of indivisible features, such as [+dative], [+instrumental], and [+genitive], but are decomposed into features which form natural classes. Abundant instances of case syncretism, especially in Slavic languages, support the idea of natural classes of case features.

Determining case features in Slavic is a complex issue, which has been pursued by Franks (2002) and Müller (2004) in Minimalism and DM.[13] I claim that case features should be syntactically and semantically motivated according to the case determination criterion established in (58). Thus, I assume four binary case features—[±structural], [±internal], [±inherent], and [±quantificational]. The feature [+structural] refers to a syntactic structural Case valued by any of the following functional heads: C, T, *v,* Neg, Pred, and

Table 4.3   Decomposition of Case Features in Old East Slavic

	Nom	*Acc*	*Gen*	*Dat*	*Loc*	*Instr*
Structural	+	+	±	±	−	±
Internal	−	+	−	−	−	−
Inherent	−	−	−	±	−	−
Quantificational	−	−	±	±	−	−

Q. According to a well-established Minimalist assumption (Chomsky 2001, 2008a), T values structural nominative case, whereas *v* values structural accusative case. Following Bailyn (2004), I assume that besides the nominative and accusative, Slavic has other structural cases which are valued by the following functional heads: C values dative, Q values genitive, and Pred values instrumental.

To distinguish an internal argument from its external counterpart (Kratzer 1996), I assume that the feature [+internal] specifies a case on a complement DP valued by the *v* head in the *v*P projection. The feature [+inherent] is valued by a lexical head which also assigns it a theta role. Therefore, cases which bear [+inherent] feature are predictable due theta-roles of their DPs. The feature [+quantificational] is assigned to a structural case which refers to a quantificational or scope relation.

Based on the five binary case features which I assume, the six primary cases in Old East Slavic are decomposed as shown in (table 4.3).[14]

In the preceding discussion, I presented and motivated case features which can be chosen for addition at a Kase node at the level of MS. The case features of a dative DP *žen-a-ma* are determined by the argument structure in which this DP appears. In the syntax, the dative DP *žen-a-ma* does not have structural case; rather it has inherent case valued by the lexical verbal head *reče* ("said"), which also assigns this DP the theta role of a goal.

Based on the syntactic configuration and argument structure of the verb *reče* ("said"), the case features [-struc, -int, +inh, -quant] are added at the Kase node of the dual dative DP *žen-a-ma.* At MS, the structure of the DP *žen-a-ma* with an added [-struc, -int, +inh, -quant] case feature bundle at the K head looks as shown in (figure 4.14). In the structure in (figure 4.14), the K node and the Num node are in a sisterhood relationship, and a *Fusion* rule can apply to fuse the two nodes together (45).

(45) Fusion Rule for OR Nominal Num/K Node
      [Num -sg -aug] ⌐K -struc, -int, +inh, -quant] →
      [Num/K -sg, -aug, -struc, -int, +inh, -quant]

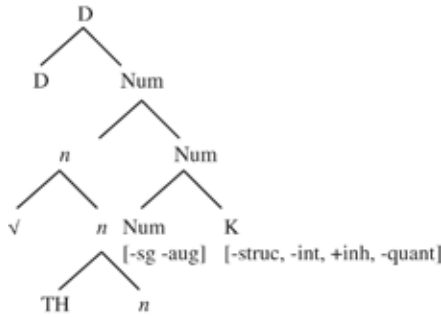The final structure of the dual noun *žen-a-ma* before Vocabulary Insertion is shown in Figure 4.14.

Figure 4.14   Addition of Case Features at MS.

The final step in the derivation of the dual dative form *žen-a-ma* is Vocabulary Insertion at PF. The VIs for the inflectional suffixes of an Old East Slavic *a-stem noun *žen-a-ma* are shown in (46). The syncretic nominative and accusative cases are realized by the VI /ĕ/ which is completely underspecified. The genitive and locative cases are realized by the VI /u/ with the feature [-quant]. The dative and instrumental cases are realized by the most specific VI /ma/ due to the number of features listed in the context for its insertion.

(46)   VIs for Old East Slavic Dual Nominal Suffixes
    Nom/Acc   /ĕ/ ↔ elsewhere
    Gen/Loc   /u/ ↔ [-quant]
    Dat/Instr   /ma/ ↔ [±struc, -quant]

The morphosyntactic derivation of dual pronouns proceeds similarly to the derivation of dual nouns. For example, let us take the dual pronoun subject *vy,* which appeared as early as the eleventh century in Old East Slavic in the *Ostromir Gospel* (1056–1057) (47). I assume that in narrow syntax, the subject DP *vy* has a structure with a Number (Num) node and a Person (P)
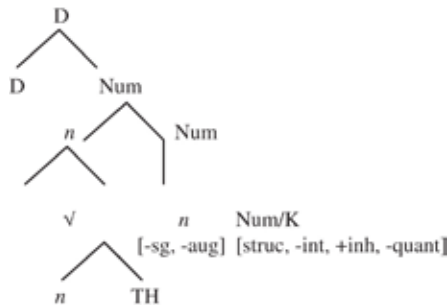

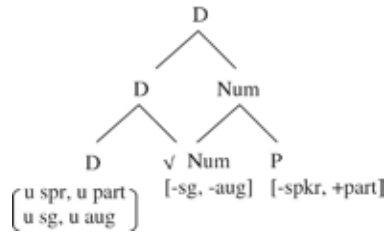**Figure 4.15   The Structure of the Dual Noun žen-a-ma at MS.**

Figure 4.16   Structure of the Old East Slavic 2nd person Dual Pronoun vy in NS.

node headed by the D head (figure 4.16). A DP-internal Num head is assumed following Ritter (1991, 1995). I further postulate a Person (P) node to be adjoined to the Num node (Bianchi 2006).[15]

(47) Old East Slavic

НЄ БОНТА БЪІ СѦ

ne boi-ta vy sę

NEG fear-2.DU.IMP 2.DU.NOM REFL

"Don't be afraid you two."

(*Ostromir Gospel*, Math. 28.5, 203:5)

The interpretable phi-features of the second person dual pronoun *vy* are located on the Num and P heads. The Num head hosts the number features [-sg -aug] representing dual number, and the P head hosts the person features—[-spkr, +part] representing the second person (Harley 2008). The D head of the DP has the uninterpretable phi-features: second person and dual number features, which need to be valued. Valuation of the uninterpretable person and number features on D occurs when the interpretable second person and dual number features are copied from the P and Num heads onto the D head (figure 4.17).

As I have previously established, morphological case features do not appear in the structure of a DP in the narrow syntax. Kase nodes and Kase
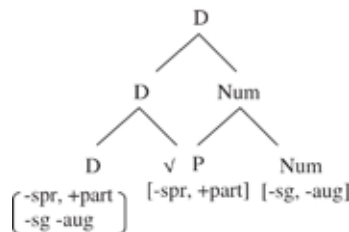

Figure 4.17   Syntactic Structure of the Old East Slavic 2nd Dual Pronoun vy after Valuation of D.
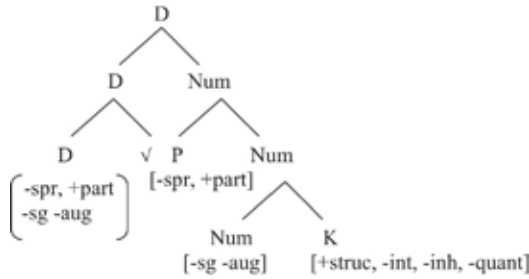
Figure 4.18   Structure of the Old East Slavic 2nd Dual Pronoun vy at MS.

features are added to the structure of a DP at MS. The second person dual pronoun *vy* which occurs in the nominative case has its nominative case features added at the K node as shown in (figure 4.18).

The last step in the morphosyntactic derivation of the dual pronoun *vy* is to fuse person, number, and case features before Vocabulary Insertion at PF. A language-specific fusion rule applies to Old East Slavic at MS to fuse person, number, and case features in one portmanteau morpheme (48). The final structure of the Old East Slavic dual nominative pronoun before Vocabulary Insertion is shown in (66).

(48)   Fusion Rule for OR P/Num/K Nodes
       [P -spr, +part] ⌐Num -sg, -aug] ⌐K+struc, -int, -inh, -quant] →
       [P/Num/K -spr, +part, -sg, -aug, +struc, -int, -inh, -quant]

Figure 4.19   Structure of the Old East Slavic Dual Pronoun vy with a Fused P/Num/K Node at MS.

4.3 IMPOVERISHMENT, FISSION, AND MORPHOSYNTACTIC SIMPLIFICATION OF THE SLAVIC DUAL

It is well-known that there is no isomorphism in the mapping between syntactic terminal nodes and PF. If this were the case, then for each syntactic node

```
┌─────────────────────────────────┐
│       Narrow Syntax (NS)        │
└─────────────────────────────────┘
                 │
                 ▼
┌─────────────────────────────────┐
│   Morphological Structure (MS)  │
│                                 │
│   Impoverishment, Fission, and  │
│              Fusion             │
└─────────────────────────────────┘
                 │
                 ▼
┌─────────────────────────────────┐
│      Phonological Form (PF)     │
│                                 │
│       Vocabulary Insertion      │
└─────────────────────────────────┘
```
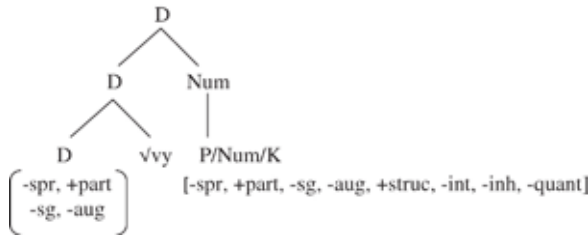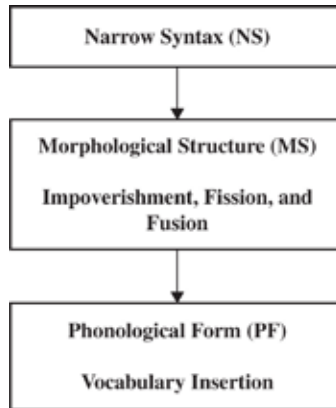
Figure 4.20   Impoverishment, Fission, and Fusion at MS.

in the narrow syntax there would be one corresponding VI at PF. However, such one-to-one correspondence obtains only in the unmarked case. In many instances, morphosyntactic features residing at syntactic nodes are altered by the following operations—Impoverishment, Fission, and fusion. All of these morphological operations apply at MS before Vocabulary Insertion at PF (figure 4.20).

Impoverishment is an operation which deletes certain morphosyntactic features at the level of MS prior to Vocabulary Insertion. In the literature (Bonet 1991; Halle 1997; Noyer 1997; Bobaljik 2002; Harley 2008) Impoverishment rules have been used to explain syncretism and metasyncretism of inflectional categories. When an Impoverishment rule applies, a certain morphosyntactic feature or features is/are deleted in a specific context. As a result of deletion, the same VI can be inserted into several syntactic nodes represented by different morphosyntactic feature bundles. Due to Impoverishment, fewer VIs can realize a greater number of morphosyntactic feature bundles in syntactic nodes. This shows that there is no isomorphism between syntactic nodes in the narrow syntax and their phonological exponents at PF.

I argue that due to the markedness of its feature values, the Slavic dual is subject to Impoverishment of other orthogonal features, such as person, gender, and case. An example of Impoverishment of case features can be seen in the dual suffixes of Old East Slavic nouns (see Krys'ko and Žolobov 2001, 51).

It is striking that in the dual there are three suffixes which realize six cases of Old East Slavic nouns in each of the seven nominal declension classes. There is a clear pattern of Nom/Acc, Gen/Loc, and Dat/Instr instances of case syncretism which cuts across seven declension classes of Old East Slavic nouns. The same pattern of syncretism occurs in the Old East Slavic

pronouns. When the same pattern of syncretism occurs across different grammatical categories, it is called metasyncretism. Thus, the nominal suffixes in (71) demonstrate metasyncretism of case features in the dual.

Metasyncretism of case features in the nominal dual can be accounted for in a principled way via rules of Impoverishment. Impoverishment is a very powerful mechanism which, in principle, can delete any features from a morphosyntactic representation in a syntactic node. However, not any feature can be deleted. I assume that the grammar of a language contains markedness statements containing information about default *values* of different morphosyntactic features (Calabrese 2011; Harbour 2011). These markedness statements constrain feature deletion. According to grammatical markedness statements, deletion of a feature occurs only if a certain value of a feature is marked, or if it appears in an environment of another marked feature value.

I claim that the marked feature bundle of the dual; that is the feature combination [-sg -aug] triggers deletion of certain case features to capture Nom/Acc, Gen/Loc, and Dat/Instr metasyncretisms. I propose Impoverishment rules for the accusative, genitive, and dative cases in (49a-c). At the terminal node of the accusative Kase, the feature [+int] is deleted to yield Nom/Acc case syncretism. Likewise, at the genitive Kase node the [+struc,+quant] features are deleted to yield Gen/Loc case syncretism. Lastly, at the Dative Kase node, the [+inh, +quant] features are deleted to yield Dat/Instr case syncretism.

(49) Impoverishment Rules for Old East Slavic Dual Nominal Suffixes
    a. Acc Kase [+int] → ∅/ Num˚ [-sg -aug]
    b. Gen Kase [+struc, +quant] → ∅/ Num˚ [-sg -aug]
    c. Dat Kase [+inh, +quant] → ∅/ Num˚ [-sg -aug]

In contrast to Underspecification, which cannot explain why case features have to be always underspecified in the dual across different VIs representing seven declension classes of Old East Slavic nouns, Impoverishment provides a principled explanation of the metasyncretic patterns because case features are deleted from a morphosyntactic representation before Vocabulary Insertion can apply. An Impoverishment analysis entails that the absence of case features in the dual of Old East Slavic nominal suffixes is not simply an accident of vocabulary item specification but is a systematic phenomenon in Old East Slavic morphosyntax.

Fission is another operation of MS which is key to my analysis of diachronic changes in the Slavic dual. Fission (Noyer 1997, 1998; Halle 1997; Embick and Noyer 2007) accounts for cases where a single morphosyntactic feature bundle is split into several positions of exponence, that is, several places in the morphosyntactic structure where additional phonological exponents can be inserted.

An example of Fission can be seen in the dual pronouns of Contemporary Standard Slovenian (Derdanc 1998, 2003). In Contemporary Standard Slovenian, the dual nominative in the first, second, and third persons consists of two morphemes—the plural pronoun *mi/ vi/ oni* and the numeral *dva/dve* ("two"). Historical data show that by the sixteenth century, Slovenian dual and plural pronoun forms in the first and second persons had become syncretic, and were realized by the VIs /mi/ and /vi/. To distinguish dual forms from the plural, new dual forms *midva* and *vidva* appeared in sixteenth-century Slovenian in the first and second person nominative (Derdanc 1998, 2003; Jakop 2008).

To account for the emergence of "new" dual pronouns in the sixteenth-century Slovenian, I suggest that Fission be applied at MS to split a marked feature bundle [-sg -aug] of the dual into two features [-sg] and [-aug] (50). As a result of Fission, the Slovenian dual forms *midva* and *vidva* are no longer syncretic with the plural forms *mi* and *vi.* More importantly, a marked feature combination [-sg -aug] has become morphosyntactically simplified due to creation of two simpler morphemes *-i* and *-dva.*

(50)   Sixteenth-century Slovenian Dual Pronoun Fission Rule
       [-sg -aug] Num → [-sg] Num [-aug] Num

At PF, two VIs are inserted into two positions of exponence created by Fission (51). The VI /dva/ is inserted in the context of the [-aug] feature while the VI /i/ is the elsewhere form which realizes both the dual and plural.

(51)   /dva/ ↔ [-aug]
       /i/ ↔ elsewhere

Fission is a strategy that languages employ to reduce markedness of feature values. Based on diachronic changes in the Slavic dual, I claim that Fission is used to reduce value markedness of dual number features in the morphosyntactic representation by creating two positions of exponence.

4.4 CONCLUSION

In this chapter, I have demonstrated how Slavic dual nouns, pronouns, and verbs (by agreement with a pro/nominal) are derived in DM (Harley and Noyer 1999). I have further shown that the Slavic dual is represented by a portmanteau morpheme which is featurally complex. It contains a bundle of phi-features—person, number, and gender as well as case features. These features are distributed among different components of grammar.

Dual number is represented by the [-sg -aug] features which are present in Narrow Syntax. Morphological Structure, a component, which mediates Narrow Syntax and PF, plays a crucial role in restructuring of morphosyntactic representation of the Slavic dual. More importantly, I have demonstrated that economy operations of Impoverishment and Fission, which apply at MS, offer a key explanation of diachronic changes in the Slavic dual. Both Impoverishment and Fission apply to reduce markedness of feature values of the dual and result in simplification of morphosyntactic representation of the dual.

NOTES

1. In many cases, no such isomorphy obtains due to operations of Impoverishment and Fission which apply at the level of Morphological Structure. These operations are discussed in Section 4.3. of this chapter.

2. I use the term *word* descriptively, and not a as unit of lexicon as in Lexicalist theories espoused by Lieber (1992) and DiSciullo and Williams (1987).

3. Inherent and lexical are non-structural cases which play a role in case marking of Slavic DPs. In Slavic and in other languages, lexical case is unpredictable, and is valued by a lexical head, such a verb, or a preposition (Woolford 2006; Richards 2007). Inherent case (such as dative in Slavic) is valued by a lexical head which also assigns it a theta role. Therefore, inherent case is predictable because it is linked to assigned theta-roles.

4. Old Church Slavic verbal stems of perfective aspect (which is lexical, that is, Aktionsart) in the present tense can also express a future event (Xaburgaev 1986, 190; Lunt 2001, 81).

5. I assume (Chomsky 2008a, 2008c) that CP is a phase, whereas TP is not. T can bear both uninterpretable phi-features (person and number) and interpretable Tense feature only if it is selected by C. Since T is selected by C, T "inherits" its uniterpretable phi-features and interpretable tense features from C. For more details on phasehood of CP and not TP, see Chomsky (2008a, 2008c).

6. For the purpose of clarity of exposition, I do not provide a full structure of the DP in (42). I return to the full structure of the DP later in this section.

7. According to the Minimalist Approach, the head *v* is "the functional category which heads verb phrases with full argument structure unlike unaccusatives and passives" (Chomsky 2008a, 17).

8. I assume that structurally an AGR node is added by the process of adjunction (Embick and Noyer 2007, 306).

9. The verb *ispiti* belongs to the third conjugation class according to its stem in the second person singular form *ispi-je-ši* (Krivčik and Možejko 1985, 133).

10. The thematic vowel *-a* shows up in the dative case of *a-stem nouns in the dual.

11. In Section 5.1. of chapter 5, I provide a detailed account of dual number features.

12. It is not crucial for my proposal of the Principle of Morphosyntactic Feature Economy and for my analysis of the Slavic dual what particular case decomposition theory is assumed. The proposed principle of Morphosyntactic Feature Economy applies regardless of the how case features are decomposed.

13. Franks (2002) proposes four binary case features [±oblique], [±marginal], [±indefinite], and [±quantified]. Although Franks's proposal is a viable option to capture Russian case syncretisms and genitive and dative of quantification, it does not allow for the instrumental to be structural. I suggest that instrumental case be represented by the [±quant] feature; that is, it can be both structural assigned by the Pred head and lexical assigned by the lexical V or P head. I do not adopt Müller's (2004) [±subject], [±governed], and [±oblique] case features since they do not follow from the Minimalist view of case and argument structure assumed in this book.

14. I exclude the vocative case in the singular and focus on the six primary cases.

15. Bianchi (2006) argues for a separate syntactic projection of Person in the structure of Italian DPs.

Chapter 5

The Slavic Dual and Number Theory

One of the most interesting aspects of dual number inflection in Slavic is a mismatch between its formal representation in Narrow Syntax and Morphological Structure. There are two questions about the morphosyntactic representation of the Slavic dual which I address in this chapter. First, what are the number features which represent the Slavic dual in Narrow Syntax? Second, what are the patterns of cross-linguistic variation in the realization of the Slavic dual at Phonological Form?

5.1 THE TWO NUMBER FEATURES OF THE SLAVIC DUAL

I begin with the analysis of the morphosyntactic structure of the Slavic dual in Narrow Syntax. I argue that in Narrow Syntax the Slavic dual is represented by a combination of the two features—[-singular -augmented]. I support my argument for this featural representation by providing evidence of the distribution of the [-singular] and [-augmented] features in the bimorphemic dual forms in Contemporary Standard Slovenian, Upper Sorbian, and Lower Sorbian. I show that dual pronouns in Slovenian and Sorbian are composite and consist of two elements: the plural form and the numeral *two* or the dual suffix. The two features which make up the dual are distributed in the following way: the [-singular] feature is encoded by the plural form whereas the [-augmented] feature is expressed by the numeral *two* or a dual suffix.

The Slavic dual has a complex morphosyntactic composition and cannot be viewed as a simplex feature, such as [dual]. It was noticed by Hale (1973) and Silverstein (1976) that number features, such as [singular], [dual], [trial],

Table 5.1 **Dual/Plural Syncretism in Contemporary Standard Slovenian**

Num/Person	Nom	Acc	Gen	Loc	Dat	Instr
DL						
1.	**mi**-dva, mi-dve/me-dve	na-ju			na-ma	
2.	**vi**-dva, vi-dve/ve-dve	va-ju			va-ma	
3.	ona-dva, **oni**-dve/one-dve	nji-ju			nji-ma	
PL						
1.	**mi**/me	na-s		na-m		na-mi
2.	**vi**/ve	va-s		va-m		va-mi
3.	**oni**/one	nji-h		nji-m		nji-mi

[quadral] . . . and [plural] are not atomic. If the feature [dual] were atomic, then it would be impossible to explain why the dual syncretizes with the plural and the singular cross-linguistically.

Instances of dual/plural and dual/singular syncretism are well attested in the world's languages. In Contemporary Standard Slovenian, the pronominal stems *mi, vi, oni* are syncretic in the dual and plural (table 5.1). In Hopi (Uto-Aztecan), the dual and singular syncretize in the verbal inflection marked by the null suffix on the verb *paki* (52a–b), while the dual and plural sincretize in the pronominal inflection encoded by the suffix *-ma* (52b–c). In Navajo (Na Dene), the dual is syncretic with the plural and realized by the stem *nihí* (Young and Morgan 1980).

(52) Hopi
    a. miʔ maana **paki**
        that girl.SG enter.SG
        "That girl entered."
    b. mi-**ma** maana-t **paki**
        that- PL girl-PL enter.SG
        "Those (two) girls entered."
    c. mi-**ma** ma-man-t yɨŋ^{y}a
        that- PL RED-girl-PL enter.PL
        "Those girls (many) entered."

(Jeanne 1978, 73)

Based on the cross-linguistic evidence of instances of dual/plural and dual/singular syncretism, it is reasonable to assume that atomic number features [singular], [dual], and [plural] are not viable and should be decomposed into combinations of the two bivalent features—[±singular] and [±augmented].[1] A bivalent approach to number features is more economical since there are only two features which are posited with binary values instead of several features in a monovalent approach.

Following Noyer's (1997) fundamental insight, I assume that the two bivalent features [±singular] and [±augmented] are sufficient to encode a singular–dual–plural number distinction (53). In Noyer's system, the dual is represented as a combination of the [-singular -augmented] features. The key observation about the featural composition of the dual is that it shares the [-augmented] feature with the singular and the [-singular] feature with the plural.

(53) Feature-Based Representations of Number Categories (Noyer 1997)
      Singular   [+singular -augmented]
      Dual   [-singular -augmented]
      Plural   [-singular +augmented]

Following Link (1983) and Harbour (2008), I assume a lattice-theoretic approach to the semantics of nominal predicates. According to this approach, the denotation of a nominal predicate represents a set of atoms and the set of subsets of the atoms. The lattice-theoretic semantic approach is shown in figure 5.1.

The bottom row of the lattice in figure 5.1 represents atoms. For example, *s, t, u, v, w, and x* are atoms. The points of intersection of the lines above the atoms represent sets. For example, the point of intersection above the atoms *s* and *t* represents a set {s, t}. The next point of intersection above *t* corresponds to a set {s, t, u}. The lattice in figure 5.1 illustrates that the lowest row of elements represents individual atoms or singular number. The level above single atoms represents sets consisting of two atomic members. Such sets of two atoms correspond to dual number. The level above dyads represents sets which consist of three members, the triads, etc.

I define the features [±singular] and [±augmented] in a formal semantic framework where features are represented as truth-conditional predicates (Noyer 1997; Harbour 2008, 2011b; Nevins 2011).[2] The feature [+singular] applies to a predicate (P) and picks out atomic elements which satisfy P, where *x* is an atom relative to P if and only if there is no *y* which is a subset of *x* (54a). The [-singular] feature picks out referents which are non-atomic,
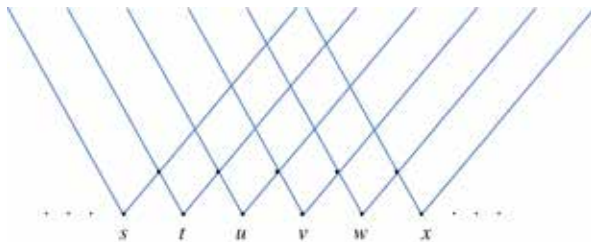

Figure 5.1   Lattice-Theoretic Approach to Nominal Predicates.

that is, not atoms (54b). I assume feature negation as shown in (55). Minus values of numbers features are defined as negation of the plus values.

(54) The Definition of the [±singular]
  a. [+singular] = ($\lambda\, x$) [atom (x)] iff ¬ $\exists y$ [P(y) ∧ $y \subset x$]
  b. [-singular] = ⌐ ($\lambda\, x$) [atom (x)]
(55) Feature Negation
  [+F] = ⌐ [+F]

The feature [±singular] breaks up the lattice assumed above into atomic and non-atomic regions (figure 5.2). The [+singular feature defines atomic elements while the [-singular] feature defines non-atomic elements.
 A formal semantic definition of the [±augmented] feature is given in (56). The feature [±augmented] is interpreted in terms of a set and its proper subset relation. The feature [+augmented] applies to a predicate P and picks out properties which hold of *x* and its proper subset *y* (56a). The [-augmented] feature is interpreted as a negation of the [+augmented] feature, which means that for a predicate (P) *y* has no proper subset *x* (56b). If interpreted in isolation, the [±augmented] feature breaks up the lattice into two partitions (figure 5.3).

(56) The Definition of the [±augmented]
  a. [+augmented] = λ P $\exists y$ [P(x) ∧ P (y) ∧ $y \subset x$]
  b. [-augmented⟧ = ⌐ λ P $\exists y$ [P(x) ∧ P (y) ∧ $y \subset x$]

The [±singular] and the [±augmented] features combine to produce singular, dual, and plural number. When these two features co-occur, they are interpreted by function application (57). According to a rule of semantic composition in (57), the [±singular] feature is a function of the [±augmented] feature. This is a key point to semantic composition of the dual and plural.

(57) Semantic Composition
  [±singular] and [±augmented] = [±augmented] ([±singular])

Let us consider the semantic composition of the singular. The [+singular] feature selects elements which are atoms without proper subsets (54a). If a
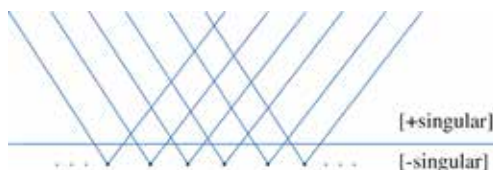
[+singular]
[-singular]

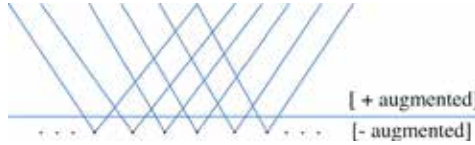**Figure 5.2 Lattice-Theoretic Semantics of the [±singular] Feature.**

Figure 5.3   Lattice-Theoretic Semantics of the [±augmented] Feature.

predicate (P) is [+singular], its reference set contains only one member, such as {a} whose cardinality equals 1. Since the reference set {a} is atomic, it contains no proper subsets. Therefore, for the value [+singular], the reference set is [-augmented]. Thus, the singular or the reference set of cardinality 1 is defined as [+singular -augmented].

The featural composition of the plural proceeds in the following way. The plural has a cardinality set which is greater than 2, and contains at least 3 members in a set, such as {a, b, c}. The reference set {a, b, c} is non-atomic; therefore, the plural is [-singular] (54b). The [-singular] feature is interpreted as a function of the [+augmented] feature. According to the definition of the [+augmented] feature, a non-atomic property of the [-singular] should also hold of its proper subset. The reference set of the plural {a, b, c} contains at least one proper subset, such as {a, b} which is non-atomic. Since the reference set of the plural contains a non-atomic proper subset, the feature [+augmented] applies. Thus, the plural or a reference set of the cardinalty 3 is a combination of the [-singular +augmented] features.

The dual is a combination of the [-singular -augmented] features. A formal semantic definition of the dual is given in (58). According to this definition, the dual consists of a non-atomic *x* without a proper subset *y* which is also non-atomic.

(58) The Dual
      [-singular -augmented]
      = [-augmented ([-singular])]
      = $(\lambda P) (\lambda x: P(x)) \neg\exists y [P(y) \wedge y \subset x] ((\lambda x) [\neg \text{ atom } (x)])$
      = $(\lambda x : \neg\text{atom} (x)) \neg\exists y[\neg\text{atom} (y) \wedge y \subset x]$

The semantic composition of the dual proceeds in the following way. The referential cardinality of the dual equals 2, and its reference set consists of two elements, such as {a, b}. This reference set is non-atomic, and hence is [-singular]. The reference set {a, b} contains no proper subsets which are non-atomic since its proper sets {a} and {b} are atomic. Due to the absence of a proper non-atomic subset in the set {a, b}, the feature [-augmented] applies. Thus, a dual or a dyad consists of a minimum of two elements in its subset which are atomic.

Table 5.2   Old East Slavic Personal Pronouns in the Ostromir Gospel (1056–1057) (Corpus Manuscript)

Num/Person	Nom	Acc	Gen	Loc	Dat	Instr
SG						
1.	azŭ	men-e			mŭn-ě	mŭno-jǫ
2.	ty	teb-e			teb-ě	tob-jǫ
DU						
1.	vě	ny	na-ju		na-ma	
2.	**vy**	va	va-ju		va-ma	
PL						
1.	my		na-sŭ		na-mŭ	na-mi
2.	vy		va-sŭ		va-mŭ	va-mi

I have established that semantically the dual is composed of the two features—[-singular -augmented]. Now I will illustrate how the number features of the Slavic dual are represented in Narrow Syntax. Let us consider the second-person nominative dual pronoun *vy* in Old East Slavic from the pronominal paradigm obtained from the *Ostromir Gospel* (1056–1057), one of earliest Old East Slavic manuscripts (table 5.2).

I assume that in NS number features are hosted by a special designated Number node (Num) within the DP (Ritter 1995). According to this assumption, the NS structure of the Old East Slavic second-person dual pronoun *vy* is as shown in (77). In the syntactic structure (77), the terminal Num node has a fully specified morphosyntactic feature bundle [-singular -augmented] which represents the dual. The Person node (P) represented by the [-speaker, +participant] features is a complement to the Num head.

The NS representation of an Old East Slavic dual pronoun as the [-singular -augmented] feature combination is confirmed by evidence from verbal agreement. In Old East Slavic, present-tense verbs are marked for dual number by the suffixes –*vě* and –*ta* which are different from the plural suffixes (Možejko and Ignatenko 1988, 141).

The Ostromir Gospel provides evidence that the second-person pronoun *vy* had become syncretic with the plural as early as in the eleventh century. When the second-person dual pronoun *vy,* which is syncretic with the plural,
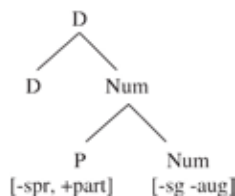
Figure 5.4   The Structure of the Old East Slavic Second-Person Dual Pronoun vy in Narrow Syntax.

occurs in a sentence, the verbal suffix –*ta* indicates agreement with the dual subject (59). The second-person plural pronoun *vy* shows plural agreement marked by the suffix –*te* when the subject of the sentence is plural (60).

(59) Old East Slavic

ꙙго же въі гл~ита ꙗко слѣпъ родиса

je-go že **vy** glje-**ta** jako slĕpŭ rodi-sę

that-ACC EMPH 2.**PL**. NOM say-2.**DU**.PRES as blind born-REFL

"You two say that he was born blind."

(*Ostromir Gospel*, John 9.19)

(60) Old East Slavic

и въі же съвѣдѣтельствоуите

i **vy** že sŭvĕdĕtelĭstvu-je-**te**

and 2.**PL** also testify-TH-2. **PL**.PRES

"And you (more than two) will also testify."

(*Ostromir Gospel,* John 15.27)

5.2 THE TWO PATTERNS OF VARIATION: THE BIMORPHEMIC AND MONOMORPHEMIC DUALS

There are two patterns of variation in the PF realization of the dual in Slavic languages: bimorphemic and monomorphemic. Bimorphemic dual pronouns are found in Contemporary Standard Slovenian, Upper Sorbian, and Lower Sorbian whereas the monomorphemic dual pronouns used to occur in Old East Slavic (eleventh to fourteenth centuries) and Kashubian in the nineteenth and the first part of the twentieth centuries (table 5.3).

I have claimed that in NS the Slavic dual is represented by a combination of the two number features—[-singular -augmented]. My claim for this combinatorial representation of the dual is supported by the distribution of the [-singular] and [-augmented] features in the bimorphemic dual forms of personal pronouns in Contemporary Standard Slovenian, Upper Sorbian, and Lower Sorbian. I analyze the bimorphemic structure of dual pronouns in the

Table 5.3   The Distribution of Bimorphemic and Monomorphemic Dual Pronouns

Bimorphemic Dual	Monomorphemic Dual
Contemporary Standard Slovenian	Kashubian
Contemporary Upper Sorbian	Old East Slavic
Contemporary Lower Sorbian	

three contemporary Slavic languages and show how the features [-singular] and [-augmented] are distributed in the dual forms.

Dual pronouns in Contemporary Standard Slovenian, Upper Sorbian, and Lower Sorbian are bimorphemic in their morphological structure and are composed of the plural stem and the numeral *two*, or the dual suffix *-j* as shown in (61).

(61)   The Structure of Bimorphemic Dual Pronouns in Contemporary Standard Slovenian, Upper Sorbian, and Lower Sorbian
         Dual = plural + dva/-j ("two")

In the structure of the Contemporary Standard Slovenian dual pronouns *mi-dva/vi-dva/oni-dva*, the numeral *dva* ("two") is very transparent. In the structure of the Upper Sorbian dual pronouns *mó-j/wó-j/wona-j*, the dual suffix *–j* had originated from the nominative suffix *–j* of the numeral *dwa-j* ("two") (Derganc 1998).

The origin of the dual suffix *–j* in the structure of the Lower Sorbian dual pronouns *me-j/we-j/wone-j* is different. Since the nominative of the numeral *dwa* in Lower Sorbian does not have a dual suffix *–j*, it is suggested that this suffix had stemmed from the suffix *–j* in the genitive forms of the personal pronouns *na-ju*, *wa-ju, je-ju* and the numeral *dwe-ju* (Schuster-Šewc 2000).

5.3 THE BIMORPHEMIC DUAL IN CONTEMPORARY STANDARD SLOVENIAN

The Contemporary Standard Slovenian pronominal dual is one of the clearest examples of the combination of the plural morpheme and number *two*. In Contemporary Standard Slovenian, the morphemic structure of the pronominal dual is very transparent. The dual form consists of the plural stem *mi/vi/oni* and the numeral *dva* ("two") (table 5.4).

I argue that in Narrow Syntax the numeral *dva* ("two") in Contemporary Standard Slovenian bimorphemic dual pronouns is represented by the Number node. Let us analyze the syntactic structure of the first-person dual pronoun *midva*. In NS, the [-singular -augmented] feature bundle of the dual is hosted by the Num node, a complement of the D head (figure 5.5).[3]

The evidence for the presence of the feature combination [-singular-augmented] of the Num node in NS comes from verbal agreement. In Contemporary Standard Slovenian, verbs are marked for dual number by the suffix *–va* in the first person and the suffix *–ta* in the second and third persons (table 5.5). As we can see, the dual verbal suffixes are morphologically different from their plural counterparts.

Table 5.4   Bimorphemic Dual Pronouns in Contemporary Standard Slovenian

Num/Person	Nom	Acc	Gen	Loc	Dat	Instr
SG						
1.	jaz	men-e			men-i	men-oj
2.	ti	teb-e			teb-i	teb-oj
3.	on, ona, ono	njega, nje	njem, njej		njemu, njej	njim, njo
DL						
1.	**mi-dva**, mi-dve/me-dve	na-ju			na-ma	
2.	**vi-dva**, vi-dve/ve-dve	va-ju			va-ma	
3.	ona-dva, **oni**-dve/one-dve	nji-ju			nji-ma	
PL						
1.	**mi**/me	na-s			na-m	na-mi
2.	**vi**/ve	va-s			va-m	va-mi
3.	**oni**/one	nji-h			nji-m	nji-mi

Figure 5.5   The Structure of the Contemporary Standard Slovenian Dual Pronoun mi-dva in Narrow Syntax.

Table 5.5   Present-Tense Agreement Suffixes in Contemporary Standard Slovenian

Number	Person		
	1	2	3
SG	-m	-š	-a
DU	**-va**	**-ta**	**-ta**
PL	-mo	-te	-jo

Let us examine an example of verbal agreement with dual subjects in Contemporary Standard Slovenian. The suffix -*va* shows agreement with the first-person dual *midva*, and the suffix –*a* attached to a participle shows agreement with the dual number and masculine gender of the same pronoun (62).

(62)   **Mi-dva** bo-**va** šl-**a** po levi poti, **vi-dva** pa po desni.
1.PL.two be.1.DU.FUT go.PRT-DU.MASC on left road, 2.PL-two and on right
"The two of us will take the road on the left while the two of you the one on the right."

(Derganc 2003, 169)

Table 5.6　Bimorphemic Dual Pronouns in Upper Sorbian

Num/Person	Nom	Acc	Gen	Loc	Dat	Instr
SG						
1.	ja	mn-je		mn-i		mn-u
2.	ty	teb-je		teb-i		tob-u
3.	wón (masc)	je-ho, nje-ho-jón, njón (masc)	je-ho, nje-ho (masc/neut)	ni-m (masc/neut)	je-mu, nje-mu (masc/neut)	ni-m (masc/neut)
	won-o/won-e (neut)	je/jo, nje/njo (neut)	je-je, nje-je (fem)	nj-ej (fem)	je-j, nj-ej (fem)	nj-ej (fem)
	won-a (fem)	ju, nju (fem)				
DL						
1.	**mó-j**	na-ju		na-maj		
2.	**wó-j**	wa-ju		wa-maj		
3.	**won-a-j**	je-ju, ne-ju		jim-aj, njim-aj		
Non-Masc	won-e-j	je-j, nje-j				
PL						
1.	**my**	na-s			na-m	nam-i
2.	**wy**	wa-s			wa-m	wam-i
3.	won-i	ji-ch, ni-ch		nich	ji-m, ni-m	ni-mi
Non-Masc	won-e	je, nje				

5.4 THE BIMORPHEMIC DUAL IN CONTEMPORARY UPPER SORBIAN

The morphemic composition of the pronominal dual in Upper Sorbian is less transparent, although it is very similar to its Contemporary Standard Slovenian counterpart. In Upper Sorbian, the first-, second-, and third-person dual is composed of the plural stem *mó/wó/won* and the suffix *-j* derived from the masculine numeral *dwaj* ("two") (table 5.6).[4] The first- and second-person dual stems *mó* and *wó* which are part of the dual are phonologically different from the stems *my* and *wy* of the plural.

There is a historical phonology explanation for this difference between the two stems. The stems *mó* and *wó* were the result of labialization and diphthongization which had occurred in Old Sorbian in the sixteenth century (Schaarschmidt 1998; Scholze 2007). Schaarschmidt argues that in most Upper and Lower Sorbian dialects, the allophone *y* became labialized to either *u* or *ó* (1998, 127).

The labialization of *y* had originated in the Upper Sorbian dialects. The Old Sorbian high central vowel [ɨ] (allophone of /i/) spelt as *y* in the plural stems *my* and *wy* was labialized as /u/ after the labials /m/ and /w/. Then, the vowel /u/ was diphthongized as /uᵒ/ spelt as *ó* in the Upper Sorbian dual forms *mó-j* and *wó-j*.[5] We can summarize labialization and diphthongization of *y* as the following phonological change: Old Sorbian *y* > Upper Sorbian *ó*.

The NS representation of the Upper Sorbian dual pronouns is identical to its Slovenian counterpart. The second-person dual pronoun *wó-j* has the syntactic structure as given in (figure 5.6). As I have argued above, the NS feature combination [-singular -augmented] representing the dual finds its reflex in the verbal agreement. In Upper Sorbian, verbs are marked by the suffix *–moj* in the first person and the suffixes *–taj/tej* in the second and third persons to reflect agreement with dual subjects (table 5.7).

The first- and second-person dual pronouns show agreement with the verb (63–64). The first-person dual pronoun *mój* triggers agreement with the verb *be* in the form *smój* while the second-person dual pronoun *wój* induces agreement with the verb *be* in the form *stej*.
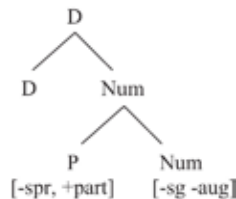

Figure 5.6   The Structure of the Upper Sorbian Second-Person Dual Pronoun wó-j in Narrow Syntax.

Table 5.7   Present-Tense Agreement Suffixes in Upper Sorbian

	Person		
Number	*1*	*2*	*3*
SG	-u	-š	-Ø
DU	**-moj**	**-taj/-tej**	**-taj/-tej**
PL	-my	-če	-u

(63) Upper Sorbian
      Ha **mój smój** wostał-oj tam
      and 1.PL-DU be.1.DU stayed- DU there
      "And we two stayed there."

                                              (Scholze 2007, 124–125)

(64) Upper Sorbian
      Wój stej najbóle skók
      2.PL-DU be.2.DU most jump
      "You two are the fastest."

                                              (Scholze 2007, 124–125)

5.5 THE BIMORPHEMIC DUAL IN CONTEMPORARY LOWER SORBIAN

In Lower Sorbian, the first- and second-person dual pronouns *me-j* and *we-j* are identical in their morphemic composition to their Upper Sorbian counterparts (table 5.10). The dual pronouns in Lower Sorbian consist of the plural stem *me* or *we* and the suffix *–j*, which had originated from the genitive forms of the personal pronouns *na-ju*, *wa-ju*, *je-ju* and the numeral *dwe-ju* ("two") (Schuster-Šewc 2000). The only difference between the Lower Sorbian and Upper Sorbian pronominal duals is the vowel /e/ which follows the labials in the forms *me-j* and *we-j*.

As in the case with Upper Sorbian, a phonological rule of labialization was applied in Old Sorbian to produce a Lower Sorbian vowel /u/ (Schaarschmidt (1998). Then some other phonological rule applied which led to a phonological change from /u/ to /e/ in the Contemporary Lower Sorbian dual.[6] Schaarschmidt (1998, 128) suggests that in Lower Sorbian, *y* generally changed into *u* after *w* with the exception of the second-person plural pronoun *wy*. He further suggests that the change from *y* to *u* also occurred after other labials, such as *b, m, p*. We can summarize labialization of *y* in Lower

Table 5.8 Bimorphemic Dual Pronouns in Lower Sorbian

Num/Person	Nom	Acc	Gen	Loc	Dat	Instr
SG						
1.	ja	m-ě	mj-e	mn-jo	m-ě	mn-u
2.	ty		teb-je			tob-u
3.	won, won-o, won-a	jo-go, jo, ju	jo-go, je-je	njo-m, njej	jo-mu, jej	ni-m, nje-ju
DU						
1.	**me-j**	na-ju			na-ma	
2.	**we-j**	wa-ju			wa-ma	
3.	**won-e-j**	je-ju, je-j	je-j	ni-ma	ji-ma	ni-ma
PL						
1.	my		na-s		na-m	nam-i
2.	wy		wa-s		wa-m	wam-i
3.	won-i	ji-ch, je	ji-ch	ni-ch	ji-m	nim-i

Sorbian as a phonological change from Old Sorbian *y* > Lower Sorbian *u* > Contemporary Lower Sorbian *e*.

In Lower Sorbian, syntactic agreement with dual subjects is reflected in the dual suffixes which are morphologically distinct from the plural ones (table 5.11). In the first-person dual, the verb is marked by the suffix –*mej* whereas in the second and third persons it is marked by the suffix –*tej*.

In the Lower Sorbian newspaper of the nineteenth century, the *Bramborski Serbski Casnik* (1848–1880), we find examples of verbs marked for dual agreement. The verb *glědaš* ("look") has the suffix –*mej* to show agreement with the first-person dual pronoun *mej* (65). Both the auxiliary verb *byš* ("be") and the verb *groniš* ("say") are inflected for the second-person dual (66).

(65) **Mej** gledach-**mej** wójadnom jaden na drugego.
 1.DU.NOM look-1.DU.AOR. together one on other
 "We two looked at each other."

(Bramborski Serbski Casnik 1852:25,
Doldoserbski Tekstowy Korpus)

Table 5.9 Present-Tense Verbal Suffixes in Lower Sorbian

Number	Person		
	1	2	3
SG	-m	-š	-Ø
DU	**-mej**	**-tej**	
PL	-my	-šo	-u

(66) **Wej stej** grońi-l-**ej**
        2.DU.NOM be.2.DU say-PERF-2.DU
        "We two have said."

(*Bramborski Serbski Casnik* 1850:04,
Doldoserbski Tekstowy Korpus)

As I have argued, Contemporary Standard Slovenian, Upper, and Lower Sorbian have pronominal duals which are composed of the plural stem and the numeral *two* or the suffix *–j* derived from this numeral. I claim that the number features [-singular] and [-augmented], which make up the dual, are distributed in a predictable way. The feature [-singular] is encoded by the plural pronominal stem while the feature [-augmented] corresponds to the numeral *two* or the dual suffix *–j*.

Let us consider the distribution of the [-singular] feature in the Contemporary Standard Slovenian, Upper, and Lower Sorbian bimorphemic duals. The evidence that this feature is encoded by the plural pronominal stem comes from cases of dual/plural syncretism. In Contemporary Standard Slovenian personal pronouns, the dual and the plural are syncretic and realized by the VI /mi/ and /vi/ (67). The dual/plural pronominal stem syncretism follows from the fact that the dual and the plural share the feature [-singular].

(67) The Dual/Plural Pronominal Stem Syncretism in Contemporary Standard Slovenian
        Dual   Plural
        1. **mi**-dva   **mi**
        2. **vi**-dva   **vi**
        3. **oni**-dva   **oni**

Diachronic data from the sixteenth-century Old Slovenian found in Dalmatin's (1584) translation of the *Bible* provides more evidence for the dual/plural syncretism in the first- and second-person pronouns *my* and *vy*. The first-person plural pronoun *my* appears with the verb marked by the dual suffix *–va* to indicate dual reference of the subject (68). The second-person plural *vy* occurs with the verb marked by the suffix *–ta* to show agreement with a dual subject (69). In both examples (68–69), the subject is used in the plural form, but the dual agreement suffixes point to the dual reference.

(68) Old Slovenian
        Mojʃter, **my** hozhe-**va**, de nama ʃturiʃh, kar te bo-**va**

teacher 1.**PL** desire-1.**DU** COMP 1.**DU.DAT** do-2.**SG.PRES** which 2.**SG** be-1.**DU.**
FUT proʃila.
ask
"Teacher, we two wish that you do for us two what we two will ask you."

<div align="right">(Dalmatian Bible, Mr 10.35)</div>

(69) Old Slovenian
    Vy ne-veʃ-**ta**, kaj prosʃi-**ta**.
    2.**PL** NEG-know-1.**DU.PRES** what ask-1.**DU.PRES**
    "You (two) don't know what you (two) are asking for."

<div align="right">(Dalmatian Bible, Mr 10.38)</div>

As I have discussed earlier, in Upper and Lower Sorbian, the pronominal stems *mó/wó* and *me/we* in the dual forms are phonologically different from the pronominal stems *my/wy* of the plural forms due to phonological changes which had occurred in Old Sorbian. Therefore, it is not apparent that pronominal stems are syncretic in the dual and plural in Lower and Upper Sorbian.

I argue that diachronically the pronominal stems of the dual and plural were syncretic in earlier stages of Sorbian since they shared the [-singular] feature. I support this claim by presenting historical evidence of the dual/plural syncretism which had occurred in Sorbian in the sixteenth century.

In the sixteenth century, the Sorbian second-person pronoun *wy* began to syncretize in the dual and plural. The verbal suffix *-tai* indicates that the pronoun *wy* has a dual reference (70). At the same time, the dual/plural syncretism had also spread to the first person. The verbal suffix *–moj* shows that the reference of the pronoun *my* is dual rather than plural (71).

(70) Old Sorbian
    Wy widz-i-**tai** a schlysch-i-**tai**
    1.**PL** see-TH-2.**DU.PRES** and hear- TH-2.**DU.PRES**
    "You two see and listen."

<div align="right">(Derganc 1998, 50)</div>

(71) Old Sorbian
    My chze-**moj** so, schtoz . . .
    1.**PL** want- 1.**DU.PRES** REFL COMP
    "We two want to . . ."

<div align="right">(Derganc 1998, 52)</div>

Based on the diachronic evidence of the dual/plural pronominal stem syncretism in sixteenth-century Sorbian, I conclude that in Upper and Lower S the pronominal stems *my/wy* encode the [-singular] feature. Similarly, in Contemporary Standard Slovenian, the dual/plural syncretism of the pronominal stems *mi/vi/oni* is the consequence of sharing of the [-singular] feature. Thus, I maintain that the [-singular] feature is encoded by the dual/plural pronominal stem.

I argue that the distribution of the feature [-augmented] follows from the semantic composition of the dual. Recall that bimorphemic dual pronouns in Contemporary Standard Slovenian, Upper, and Lower Sorbian are composed of the plural stem and either the numeral *dva* ("two") or the dual suffix *–j*. I argue that the numeral *dva* and a dual suffix *–j* encode the [-augmented] feature.

In Narrow Syntax, the dual is represented by the [-singular -augmented] feature bundle. According to a formal semantic definition of the dual, the [-augmented] feature combines with the [-singular] feature via function application. The [-augmented] feature takes the [-singular] feature as its function. Therefore, the [-augmented] feature is interpreted as a non-atomic reference set without a non-atomic proper subset. The only non-atomic subset which contains no non-atomic members in its proper subset is number 2. Thus, the most natural linguistic expression of a dyad is the numeral *two* or a dual affix. That is why the numeral *dva* and the dual suffix *–j* encode the [-augmented] feature in Contemporary Slovenian, Upper, and Lower Sorbian.

In sum, I have argued that in NS the Slavic dual is represented by a combination of the two features—[-singular -augmented]. These two features are distributed in bimorphemic dual pronouns in Contemporary Slovenian, Upper, and Lower Sorbian in a way which follows from their semantics. The [-singular] feature is encoded by the plural pronominal stem while the [-augmented] feature is encoded by the numeral *dva* ("two") or the dual suffix *–j* (table 5.10).

Table 5.10   The Distribution of the [-singular] and [-augmented] features in the Bi morphemic Dual Pronouns in Slovenian, Upper and Lower Sorbian

	[-singular]	*[-augmented]*
Contemporary Slovenian	mi/vi/oni	dva
Upper Sorbian	mó/wó/won	-j
Lower Sorbian	me/we/won	-j

5.6 THE MONOMORPHEMIC DUAL
AND ITS LOSS IN KASHUBIAN

While the dual is still a "living" category of the grammar in Contemporary Slovenian, Upper, and Lower Sorbian this is no longer the case in Kashubian. In the course of the historical development of Kashubian in the twentieth century, the monomorphemic dual pronouns syncretized with the plural, and as a result the dual number distinction was lost.

Dual pronouns in Kashubian have undergone significant diachronic changes. As recorded by a nineteenth-century Kashubian linguist Florian Ceyonowa in his *Kurze Betrachtungen über die kaßubische Sprache, als Entwurf zur Gramatik* (*Brief Notes on Kashubian Language, an Outline of Grammar*) (cir.1860), Kashubian distinguished the first-, second-, and third-person dual personal pronouns (table 5.11). In the nominative case the first, second, and third dual forms were *ma, va, wón-ji, and wón-e*.

As noted by Breza and Treder (1981, 125) in *Gramatyka Kaszubska*, the first and second dual pronouns *ma, wa, nama, wama* were the original dual forms which dated back to the twelfth century. As recorded in the *Atlas Językowy Kaszubszczyzny i Dialektów Sąsednich* (AJK, twelfth century), the first dual form *ma* meant "we two" and the second *wa* "we two." Over time, the dual meaning of these forms was lost.

In the nineteenth-century Kashubian, we still observe no dual/plural syncretism in the first- and second-person nominative since the dual pronouns are phonologically distinct from the plural ones. The first-person dual *ma*

Table 5.11 The Dual Pronouns in Kashubian (1860s)

Num/Person	Nom	Acc	Gen	Loc	Dat	Instr
SG						
1.	jó		Mje			mną
2.	te		ce		tobje	tobą
3.	wón, wóna, wóno	jeho, ją, wóno	jeho, jeje	njim, nji	jemu, ji	njim, nją
DU						
1.	**ma**		**na-ju**		**na-ma**	
2.	**va**		**va-ju**		**va-ma**	
3.	**wón-ji, wón-e**		**ji-ch, nji-ch**		**ji-ma**	**njim-ji**
PL						
1.	me		na-s		ną-m	na-mji
2.	ve		va-s		vą-m	va-mji
3.	wón-ji, wóne	ji-ch		njich	ji-ma	nji-mji

Table 5.12   The Evolution of the Kashubian Dual Pronouns

Number/Person	Nineteenth-Century Kashubian (Ceynowa 1860)	Kashubian in the 1950s (Stone 1993)	Twenty-First-Century Kashubian (Hopkins 2001)
DU			
1.	ma	ma	–
2.	va	–	–
3.	wón-ji, wón-e	–	–
PL			
1.	me	më	më
2.	ve	wa	wa
3.	wón-ji, wón-e	oni, onë	woni, wone

is distinct from the first-person plural *me*, and the second-person dual *va* is distinct from the second person *ve* (Duličenko and Lehfeldt 1998, 58–59).

As noted by Stone (1993, 768), at the beginning of the twentieth century the dual was still used in Slovincian and some other eastern dialects of Kashubian. During the historical development of Kashubian in the twentieth century, the second-person dual *va* has disappeared, and only the first-person dual forms *ma, naju, nama* were still used. However, even the first-person dual forms could not persist for a long time. As Stone (1993) further reports, in the northern Kashubian dialects, the first-person dual forms *ma, naju, nama* were no longer used by the 1950s.

It appears that by the end of the twentieth century, the dual was no longer a distinct number category in the Kashubian personal pronouns. According to a relatively recent book by Hopkins (2001), the Kashubian personal pronouns distinguish only two numbers: singular and plural. The first-person plural pronoun is represented as *më* in the Kashubian orthography, and is pronounced as /mə/. The second-person plural pronoun written as *wa* is pronounced as /va/.

The analysis of the diachronic changes in the Kashubian personal pronouns suggests that the dual has become syncretic with the plural, and as a consequence of this syncretism the dual/plural distinction was lost (table 5.12). The second-person dual *va* /va/ became syncretic with the second-person plural *wa* /va/ at some point in the development of Kashubian in the twentieth century. Likewise, the first-person dual *ma* /mæ/ became syncretic with the first-person plural më /mə/. I suggest that the introduction of the phoneme /ə/ (the so-called Kashubian schwa) resulted in the phonological change *ma* /ma/ > *më* /mə/ in the first person (Stone 1993, 765).[7] This phonological change allowed the dual to syncretize with the plural in the first person.

In contemporary Kashubian, the system of verbal agreement also shows the absence of dual suffixes with the distinction made only in the singular and

plural (Hopkins 2001). For example, agreement with the second-person plural pronoun *wa* is marked by the suffix *–ta* (72).

(72) Dzez **wa** jidze-**ta**?
      where 2.PL go-2.PL.PRES
      "Where are you going?"

(Stone 1993, 780)

In sum, diachronically, Kashubian has lost a dual number distinction in its personal pronouns due to the dual/plural syncretism in the first and second persons. Based on historical data summarized in (93), it is evident that the second-person dual pronoun *va* /va/ is the first one to syncretize with the plural. This diachronic change is quite expected since in Old Church Slavic the second-person dual *vy* was syncretic with the plural. Next, historical change affected the first-person dual *ma* which syncretized with the plural *më* due to phonological changes. The first- and second-person dual forms *ma* and *va* which were attested by Ceynowa in the 1860s were "replaced" by the plural forms *më* and *wa* by the middle of the twentieth century. As a result of this diachronic change, the dual is no longer a distinct number category in contemporary Kashubian.

5.7 THE MONOMORPHEMIC DUAL AND ITS LOSS IN OLD EAST SLAVIC

In Old East Slavic, dual number was a distinct grammatical category in the pronominal and verbal agreement systems beginning from the eleventh century when the early Russian literary tradition started to get established and the first translations of the *Bible* were made. However, already in the eleventh century dual pronouns began to show the first signs of decline as they were being replaced by the plural forms due to syncretism. During the period from the twelfth through the fifteenth centuries, the dual underwent historical reanalysis as the plural. As a result of this reanalysis, by the end of the fifteenth century, the dual was no longer a distinct grammatical category, and the number system of Russian pronouns was reduced to two members of the opposition—singular and plural.

The grammatical category of dual number in Old East Slavic (eleventh to fifteenth centuries), follows its Proto-Slavic roots. In Proto-Slavic, personal pronouns distinguished three numbers—singular, dual, and plural and three persons—second, second, and third (table 5.13). Already in PS, the second-person dual form *vy* was syncretic with the plural.[8] The dual/plural syncretism of the second person points to the instability of the dual as a grammatical

Table 5.13   Proto-Slavic Personal Pronouns

Num/Person	Nom	Acc	Gen	Loc	Dat	Instr
SG						
1.	azъ		mene		mьně	mъnojǫ
2.	ty		tebe		tebě	tobojǫ
3.	jь, ja, je	jь, ja, jǫ	jego, jejě/jejǫ	jemь, jeji	jemu, jeji,	jmь, jejǫ
DU						
1.	vě	na	naju		nama	
2.	va/vy	va	vaju		vama	
3.	ja, ji	ja, ji	jeju		jima	
PL						
1.	my		nasъ		namъ	nami
2.	vy		vasъ		vamъ	vami
3.	ji, jě/ję, ja	jě/ję	jixъ		jimъ	jimi

category. The fact that the dual "was already losing ground in Proto-Slavic" is confirmed by "having its range of cases reduced to three by the syncretization of Nominative + Accusative, Genitive + Locative, and Dative +Instrumental" (Sussex and Cubberley 2006, 41).[9]

I start my analysis with the Old East Slavic dual pronouns which occurred in the *Ostromir Gospel* (1056–1057)**,** the earliest Old East Slavic literary document. The Old East Slavic personal pronouns found in the *Ostromir Gospel* were very similar to their Proto-Slavic counterparts in terms of person, number, and case distinctions. The Old East Slavic pronouns showed a three-way number system—singular, dual, and plural and a two-way person system—first and second (table 5.14). As opposed to Proto-Slavic, the Old East Slavic third-person pronouns were not part of the system of personal pronouns. They developed later from the demonstrative pronouns *onŭ*, *ona*, *ono* and the so-called non-personal pronouns *jĭ, ja, je* (Možejko and Ignatenko 1988, 129).

The Old East Slavic dual pronouns vary in their morphological structure. In the dual, the nominative and accusative forms are monomorphemic

Table 5.14   Old East Slavic Personal Pronouns in the Ostromir Gospel (1056–1057) (Corpus Manuscript www.manuscripts.ru)

Num/Person	Nom	Acc	Gen	Loc	Dat	Instr
SG						
1.	azŭ		men-e		mŭn-ě	mŭno-jǫ
2.	ty		teb-e		teb-ě	tob-jǫ
DL						
1.	vě	ny	na-ju		na-ma	
2.	**vy**	va	va-ju		va-ma	
PL						
1.	my		na-sŭ		na-mŭ	na-mi
2.	**vy**		va-sŭ		va-mŭ	va-mi

Table 5.15   The Morphological Structure of the Old East Slavic Dual Pronouns

Monomorphemic Dual	Bimorphemic Dual
Nom, Acc 1.vě, ny	Gen/Loc -ju
2. vy, va	Dat/Instr -ma

whereas the genitive/locative and the dative/intrumental forms are bimorphemic (table 5.15). Following Šaxmatov (1957, 152), I assume that in the first and second person dual, the entire forms *vě, vy, ny, va* are stems. I do not assume that *v-* and *n-* should be treated as stems, and *-ě, -y, -a* as suffixes. In the first person, the monomorphemic nominative and accusative dual forms consist of two phonologically different pronominal stems: the stem *vě* in the nominative and the stem *ny* in the accusative. In the second person, the pronominal stems *vy* and *va* show some similarity, but are still phonologically different. The bimorphemic genitive/locative and dative/instrumental forms consist of pronominal stems *na-* or *va-* and case suffixes *-ju* or *-ma*.

I found that the second-person dual form *vy* was the only form occurring in the *Ostromir Gospel* (1056–1057). According to my findings, there were no instances of the second dual form *va* proposed by other scholars (Samsonov 1973; Možejko and Ignatenko 1988). Due to the phonological identity of the dual and plural expressed by the form *vy* dual/plural syncretism was possible in the second-person nominative. Krys'ko and Žolobov (2001) independently arrived at the same finding that the form *vy* was the only possible second-person nominative dual form which occurred in Old East Slavic and could be traced to its Proto-Slavic form. He states that the second-person nominative dual form *vy* was the only form which was used in Old East Slavic ("в древнерусском употреблении в ИП дв.ч. известна только форма вы" [Krys'ko and Krys'ko and Žolobov 2001, 76]).

I argue that the Old East Slavic dual was morphosyntactically unstable due to its syncretism with the plural in the second person. Since the times of the Proto-Slavic (2000–1500 вс), number syncretism had occurred between the dual and plural in the second-person nominative (table 5.12). The same pattern of dual/plural syncretism could be seen in Old East Slavic in the eleventh century. The second-person form *vy* was syncretic in the dual and plural as evidenced by the data from the *Ostromir Gospel* (1056–1057) (94–95). The second-person pronoun *vy* refers to two individuals since the verb is marked by the dual suffix *-ta* (73). The same pronoun *vy* has a plural reference since the verb is marked by the plural suffix *-te* (74).

(73) Old East Slavic (eleventh century)

    Нє боита въı са

    ne boi-**ta vy** sja

NEG fear-2.**DU**.IMP 2.**PL**.NOM REFL
"Don't be afraid you two."

<div align="right">(*Ostromir Gospel*, Math.28.5, 203:5)</div>

(74) Old East Slavic (eleventh century)
ВЪ ТВОРНТЄ ДѢЛО ОЦ҃А ВАШЄГО
vy tvori-**te** děl-o ots-a vaš-ego
2.**PL**.NOM do-2.**PL**.PRES thing-ACC father-GEN your-GEN
"You (more than two) do things that your father does."

<div align="right">(*Ostromir Gospel*, John 8.41)</div>

Besides the *Ostromir Gospel* (1056–1057), the data from the other well-known Old East Slavic manuscripts, such as the *Izbornik* (1076) and the *Archangel Gospel* (1092) show that the dual was syncretic with the plural in the second person. Dual reference of the second-person nominative dual *vy* is confirmed by dual agreement suffixes marked on verbs. The second-person nominative dual *vy* occurs with the verbs marked by the dual suffix *-ta*, such as *tvori-**ta***, *spse-**ta***, *živě-**t***, and *gle-**ta*** (75–77). The above data show that despite the dual/plural syncretism, the dual still remained a distinct grammatical category in the pronominal system in the eleventh century.

(75) Old East Slavic (eleventh century)
Н ВЪ ТВОРНТА ДА СП҃СЄТА СѦ
i **vy** tvori-**ta** da spse-**ta** sę
and 2.**PL**.NOM do-2.**DU**.PRES COMP save-2.**DU**.PRES REFL
"And you two do so that you will save yourselves."

<div align="right">(*Izbornik*, 112.2)</div>

(76) Old East Slavic (eleventh century)
ТАКО Н ВЫ ЖНВѢТА ЧАДѢ МОН
tako i **vy** živě-**ta** čad-ě moi
so and 2.**PL**.NOM live-2.**DU**.PRES child-3.**DU** my
"And so you two of my children will live."

<div align="right">(*Izbornik*, 112.2)</div>

(77) Old East Slavic (eleventh century)
ЄГО ЖЄ ВЫ ГЛ҃ЄТА ІАКО СЛѢПЪ РОДНСѦ

jego že **vy** gle-**ta** jako slěpŭ rodi-sę
3.SG.ACC EMPH 2.**PL**.NOM say-2.**DU**.PRES as blind born-REFL
"You (two) say that he was born blind."

(*Archangel Gospel,* 9.1)

The second-person dual *vy* which co-occurred with the dual suffix *-ta* continued to appear in the Old East Slavic manuscripts in the twelfth and in the early thirteenth centuries. I argue that the first evidence of its changed status as a plural pronoun is found in the *Simonov Gospel* (1270) where the pronoun *vy* occurs with the plural suffix *-te* (78). The plural suffix *-te* points to the fact that the pronoun *vy* has a plural reference set rather than the dual as it was seen in the eleventh-century manuscripts.

(78) Old East Slavic (thirteenth century)
И ЖЕ ВЫ ГЛ͠ТЕ ꙖКО СЛѢПЪ РОДИСА
i že **vy** gl-**te** jako slěpŭ rodi-sę
that-ACC EMPH 2.**PL**. NOM say-2.**PL**.PRES as blind born-REFL
"You (two) say that he was born blind."

(*Simonov Gospel*, 17.1)

In the fourteenth century, there was still some variation in the agreement suffixes which encoded the second-person dual. For example, in the *Laurential Codex* (1377) of the *Povest' Vremennyx Let*, the syncretic second-person dual/plural *vy* appears with the dual suffix *-ta* (79–80).

(79) Old East Slavic (fourteenth century)
И РЕЧЕ ѠЛЕГЪ АСКОЛДУ И ДИРОВИ
i reč-e wlegŭ askoldu i dirovi
and say-1.SG.PRES Oleg Askold and Dir
"And Oleg says to Askold and Dir."
ВЫ НѢС-ТА КНАЗА
vy něs-**ta** knęz-ę
1.**PL**.NOM neg.be-2.**DU**.PRES prince-du
"You two are not princes."

(*Laurential Codex*, 8.1)

(80) Old East Slavic (fourteenth century)
И Р͠Е СТОПОЛКЪ ПОСѢДИТА ВЫ СДѢ
i reč-e stopolkŭ posědi-**ta** vy sdě

and say-1.SG.PRES Stopolk sit-1.SG.PRES 1.PL.NOM here
"And Stopolk says, 'You two sit here.'"

<div align="right">(*Laurential Codex*, 87.2)</div>

In the same text of the *Laurentian Codex* (1377) are some examples where *vy* occurs with the plural suffix *-te* when the reference is made to two individuals. The pronoun *vy* appears with the verb *ima-te* marked with the plural suffix *-te* (82). It is clear from the context of (81) that the plural pronoun *vy* refers to two people.

(81) Old East Slavic (fourteenth century)
　　　 И РѢША ИМА МУЖИ СМЪIСЛЕНИИ
　　　 i rěša ima muži smyslenii
　　　 and told 3.DU.DAT men smart
　　　 "And the smart men told the two of them":

(82) Old East Slavic (fourteenth century)
　　　 ПОУТО ВЪI РАСПРА ИМАТЕ МЕЖИ СОБОЮ
　　　 počto **vy** rasprę ima-**te** meži soboju
　　　 why 1.**PL**.NOM dispute have-1.**PL**.PRES between selves
　　　 "Why do you have an argument between the two of you?"

<div align="right">(*Laurential Codex,* 73.1)</div>

In the first half of the fifteenth century, there is a tendency toward the use of the second-person plural *vy* with the plural suffix *-te*. However, there are some cases where the pronoun *vy* still occurs with the dual suffix *-ta*. A very interesting example comes from the *Ipatjevskja Letopis* (1425) where in the same passage we come across the plural pronoun *vy* occurring with both the dual suffix *-ta* and the plural suffix *-te* (83–84).

(83) Old East Slavic (fifteenth century)
　　　 ЕГО ЖЕ ВЪI ГЛ͞ЕТЕ АНТИ-ХРЪСТА
　　　 ego že **vy** gle-**te** antixrŭsta
　　　 3.SG EMPH 2.**PL** say-2.**PL**.PRES antichrist
　　　 "You two say that he is an antichrist."

<div align="right">(*Ipatjevskja Letopis*, 65.2)</div>

(84) Old East Slavic (fifteenth century)
　　　 IАКО ЖЕ ВЪI ГЛ͞ЕТА
　　　 jako že **vy** gle-**ta**
　　　 SO EMPH 2.**PL** say-2.**DU**.PRES

"So you two say . . ."

<div align="right">(*Ipatjevskja Letopis*, 65.2)</div>

The same passage from the *Primary Russian Chronicle* which appears in the *Ipatjevskja Letopis* of 1425 and the *Laurentian Codex* of 1377 shows variation in the agreement suffixes occurring with the plural pronoun *vy*. The pronoun *vy* is used with the dual suffix *-ta* in the *Ipatjevskja Letopis* (1425) whereas in the *Laurentian Codex* (1377) it is used with the plural suffix *-te* (85–86).

(85) Old East Slavic (fifteenth century)
　　　ПОУ ТО ВЪІ РАСПРЮ НМАТА
　　　počto **vy** rasprju ima-**ta**
　　　why 1.PL.NOM dispute have-1.DU.PRES
　　　"Why are you two arguing?"

<div align="right">(*Ipatjevskja Letopis*, 80.2)</div>

(86) Old East Slavic (fourteenth century)
　　　ПОУ ТО ВЪІ РАСПРА НМАТЄ МЄЖН СОБОЮ
　　　počto **vy** rasprę ima-**te** meži soboju
　　　why 1.PL.NOM dispute have-1.PL.PRES between selves
　　　"Why do you have an argument between the two of you?"

<div align="right">(*Laurentian Codex*, 73.1)</div>

By the end of the fifteenth century, we still find quite a number of instances where the second-person plural *vy* occurred with the dual suffix *-ta*. For example, in the *Radziwiłł Codex* (ca. 1490) of the *Primary Chronicle*, in the context where two individuals were referred two, the plural pronoun *vy* appeared with the dual agreement suffix *-ta* (87–89). There was one instance where the plural pronoun *vy* co-occurred with the plural suffix *-te* (90).

(87) Old East Slavic (fifteenth century)
　　　Н РЄ̃ ѠЛГЪ КЪ АСКОЛОДОВН · Н ДНРОВН ·
　　　i reč wlegŭ kŭ askolodovi i dirovi
　　　and say.1.SG.PRES Oleg to Askold and Dir
　　　"And Oleg says to Askold and Dir."
　　　ВЪІ НѢСТА КНZ̃А
　　　 vy něs-**ta** knz-ę
　　　1.PL.NOM neg.be-2.DU.PRES prince-du
　　　"You two are not princes."

<div align="right">(*Radziwiłł Codex* 11.1)</div>

(88) Old East Slavic (fifteenth century)

ПОУТО ВЫ НМАТА · РАСПРЮ · МЕЖН СОБОЮ

počto **vy** ima-**ta** rasprju meži soboju

why 1.PL.NOM have-1.DU.PRES dispute between selves

"Why do you have an argument between the two of you?"

(*Radziwiłł Codex* 126.1)

(89) Old East Slavic (fifteenth century)

Н РЕ͡СТОПОЛКЪ СѢДНТА ВЫ ЗДѢ

i reč stopolků sědi-**ta** vy zdě

and say-1.SG.PRES Stopolk sit-1.SG.PRES 1.PL.NOM here

"And Stopolk says, 'You two sit here.'"

(*Radziwiłł Codex* 139.1)

(90) Old East Slavic (fifteenth century)

Е͡ЖЕ ВЫ ГЛ͡ТЕ АНТ͡РТА

ego že **vy** gl-**te** antixrŭsta

3.SG EMPH 2.PL say-2.PL.PRES antichrist

"You two say that he is antichrist."

(*Radziwiłł Codex* 103.2)

The data from the *Ipatjevskja Letopis* (1425) and the *Radziwiłł Codex* (ca. 1490) presented above show that the dual number distinction in the pronominal system of Old East Slavic had begun to be gradually replaced with the plural number in the fifteenth century. The instances of the plural *vy* co-occurring with the plural agreement suffix *-te* demonstrate that the pronoun *vy* has a plural reference set.

In sum, during the eleventh to fifteenth centuries, the second-person dual *vy* has undergone considerable changes (table 5.16). In the eleventh to twelfth centuries, the dual *vy* began to syncretize with the plural in the second person while retaining the dual agreement suffix *-ta*. In the thirteenth century, the first instance of the plural form *vy* co-occurring with the plural

Table 5.16 The Evolution of the Second-Person Dual Pronoun vy in Old East Slavic

Time Period	Second-Person Pronoun	Agreement Suffix	Reference
11–12th centuries	plural *vy*	dual *-ta*	2
13th century	plural *vy*	dual *-ta*	2
		plural *-te*	>2
14–15th centuries	plural *vy*	dual *-ta*	2
		plural *-te*	>2

suffix *-te* appeared in the *Simonov Gospel* (1270). In the fourteenth to fif-teenth centuries, the plural agreement suffix *-te* appears with the plural form *vy* indicating plural reference. I assume that the process of replacement of the dual suffix *-ta* with the plural suffix *-te* continued into the sixteenth century (Šaxmatov 1957).

In contrast to the second-person nominative *vy,* the first-person nomina-tive *vě* was not subject to syncretism as early as in the eleventh century. The dual pronoun *vě* did not syncretize with the plural *my* in the first person due to the phonological difference in the pronominal stems. The first-person dual *vě* occurred in a number of the eleventh-century Old East Slavic manu-scripts including the *Ostromir Gospel* (1056–1057) and the *Archangel Gos-pel* (1092). The dual reference of the first-person dual *vě* was indicated by the agreement suffix *-vě* marked on the verb (91–92). Thus, in the eleventh century the first-person dual was systematically used with the dual verbal agreement suffixes.

(91) Old East Slavic (eleventh century)
ВѢВѢ ВѢ ЫКО СЬ ЮСТЬ СЪІНЪ НАЮ
vě-**vě** **vě** jako sĭ jestĭ synŭ najǫ
know-1.DU.PRES 1.DU.NOM as this is son our
"We two know that he is our son."

(*Ostromir Gospel*, John 9.20)

(92) Old East Slavic (eleventh century)
ДА ВѢ ОУБО ВЪ ПРАВЬДОУ
da **vě** ubo vŭ pravĭdu
COMP   1.DU.NOM as in truth
ДОСТОИНА БО ПО ДѢЛОМЪ НАЮ ПРИЮМЛЮВѢ
dostoina bo po dělomŭ naju prijemlje-**vě**
worth for on deeds 1.DU.GEN receive-1.DU.PRES
"We are punished justly, for we are getting what our deeds deserve."

(*Archangel Gospel*, 110.2, Luke 23.41)

According to Krys'ko and Žolobov (2001), in the thirteenth century, we still find the first-person dual pronoun *vě* occurring in some of the Old East Slavic manuscripts. For example, in the *Tolkovyj Apostol* (1220), the first-person dual *vě* occurs with the expected dual agreement suffix *-vě* (93–94).

(93) Old East Slavic (thirteenth century)
ДА ВѢ ВЪ ЫЗЪІКЪІ
da **vě** vŭ jazyky

COMP 1.DU in pegans
"For us two to go to the pegans."

<div align="right">

(Krys'ko and Žolobov 2001, 149,
Tolkovyj Apostol, Gal.9.9)

</div>

(94) Old East Slavic (thirteenth century)
    ТЪКМО НИЩАІА ДА ПОМНИВѢ
    t ŭkmoništaja da pomni-**vě**
    only poor COMP remember-1.DU.PRES
    "So that we two don't forget the poor."

<div align="right">

(Krys'ko and Krys'ko and Žolobov
2001, 149, *Tolkovyj Apostol*, Gal. 9.10)

</div>

The first instance of the first-person plural pronoun *my* instead of the first-person dual *vě* occurred in the middle of the fourteenth century as evidenced by the data from the *Čudov Apostl* (1355), an Old East Slavic translation of the *New Testament* (Krys'ko and Žolobov 2001, 149). In the *Čudov Apostl* (1355), the first-person dual *vě* was replaced by the first-person plural *my* when the reference was made to two individuals (95). The plural suffix -*mŭ* which occurs in the next sentence in the manuscript indicates reference to the plural (96).

(95) Old East Slavic (fourteenth century)
    ДА МЫ ВЪ ІАЗЪІКЪІ
    da **my** vŭ jazyky
    COMP 1.PL in pegans
    "For us two to go to the pegans."

<div align="right">

(Krys'ko and Žolobov 2001:149,
Čudov Apostl, Gal. 9.9)

</div>

(96) Old East Slavic (thirteenth century)
    ТЪКМО НИЩИN(Х) ДА ПОМИНАНМЪ
    tokmo ništix da pominaje-**mŭ**
    only poor COMP remember-1.PL.PRES
    "So that we don't forget the poor."

<div align="right">

(Krys'ko and Žolobov 2001,
149, *Čudov Apostl*, Gal. 9.9)

</div>

In the late fourteenth century, we still find evidence of the first-person dual *vě* appearing with the dual agreement suffix -*vě* in the *Laurentian Codex*

(1377) of the *Primary Russian Chronicle*. The first-person dual *vě* occurs with the dual suffix *-vě* (97–98).

(97) Old East Slavic (fourteenth century)
ВѢ ПОСЛЕВѢ К БРАТУ СВОЮМУ
vě posle-**vě** k bratu svojemu
1.DU.NOM send-1.DU.PRES to brother own
"We two will send to our brother."

(*Laurentian Codex*, 58.2)

(98) Old East Slavic (fourteenth century)
ВѢ ЕСВѢ АНГ̅ЛА
vě es-**vě** angl-a
1.DU.NOM be-1.DU.PRES angel-3.DU
"We two are angels."

(*Laurentian Codex*, 65.1)

Let us contrast the above sentences (97–98) from the *Laurentian Codex* (1377) with the same sentences in the *Radziwiłł Codex* (ca. 1490). The replacement of the first-person dual pronoun *vě* with the first-person pronoun *my* was gradual. First, we find that in the *Radziwiłł Codex* (ca. 1490) the first plural *my* occurred instead of the first-person dual *vě* even when the dual suffix *-vě* remained unchanged (99). Next, the first-person plural *my* appeared with the plural agreement suffix *-i* on the DP (100). Finally, we find examples where the first-person plural *my* occurred with the plural suffix *-mŭ* (101).

(99) Old East Slavic (fifteenth century)
Мꙑ ПОСЛЕВѢ КО БРАТ̅ СВОЕМꙋ
my posle-**vě** ko bratu svojemu
1.PL.NOM send-1.DU.PRES to brother own
"We two will send to our brother."

(*Radziwiłł Codex*, 101.1)

(100) Old East Slavic (fifteenth century)
Мꙑ АГ̅ГЛИ
my anggl-i
1.PL.NOM angel-3.PL
"We are angels."

(*Radziwiłł Codex*, 111.2)

Table 5.17   The Evolution of the First-Person Dual Pronoun vě in Old East Slavic

Time Period	First-Person Pronoun	Agreement Suffix	Reference
11–13th centuries	dual *vě*	dual -*vě*	2
14–15th century	dual *vě*	dual -*vě*	2
	plural *my*	dual -*vě*	2
	plural *my*	plural -*mǔ*	>2

(101)   Old East Slavic (fifteenth century)
         мъі вѣдаємъ
         my vǔdae-**mǔ**
         1.PL know-1.PL.PRES
         "We two know."

(*Radziwiłłt Codex* 103.2)

   In sum, the first-person dual pronoun *vě* has undergone considerable diachronic changes in the period from the eleventh through the fifteenth centuries (table 5.17). As opposed to the second-person dual *vy* which syncretized with the plural already in the eleventh century, the first-person dual *vě* was not syncretic with its plural counterpart *my* due to the phonological difference in the stems. The first-person dual *vě* was consistently used with the dual agreement suffix -*vě* in the eleventh to thirteenth centuries. In the fourteenth to fifteenth centuries, the first-person plural *my* gradually replaced the first-person dual *vě*. As a result of these diachronic changes, by the end of the fifteenth century, the first-person plural *my* and the plural suffix -*mǔ* were used even when the reference was made to two individuals.

5.8. CONCLUSION

In this chapter, I have explored two main questions: (i) What are the number features which represent the Slavic dual in Narrow Syntax? and (ii) What are the patterns of cross-linguistic variation in the realization of the Slavic dual at Phonological Structure?

   I have argued that in Narrow Syntax the pronominal Slavic dual is represented by the two features—[-singular -augmented]. I have shown that Contemporary Standard Slovenian, Upper and Lower Sorbian have pronominal duals which are composed of the plural stem and the numeral *two* or the suffix –*j* derived from this numeral. I have further argued that the number features [-singular] and [-augmented], which make up the dual, are distributed in a predictable way. The feature [-singular] is encoded by the plural pronominal stem while the feature [-augmented] corresponds to the numeral *two* or the dual suffix –*j*.

I have identified two patterns of cross-linguistic variation in the PF representation of the Slavic dual-bimorphemic and monomorphemic. The bimorphemic pronouns occur in the three contemporary Slavic languages—Slovenian, Upper and Lower Sorbian. The bimorphemic structure of the dual pronouns in these languages has emerged diachronically as a result of the dual/plural syncretism in the pronominal number system. The monomorphemic pronouns used to be a part of the singular/dual/plural pronominal number system in Old East Slavic and Kashubian. However, over time these monomorphemic duals were replaced by the plural pronouns due to syncretism, especially in the second person. As a result of this diachronic change, contemporary Russian and Kashubian pronouns distinguish only between the singular and plural.

The next most important question which needs to be answered is why the two different patterns in the PF realization of the Slavic dual emerged, and what principle or mechanism is responsible for their emergence. I provide my arguments regarding this question in the next chapter of the book.

NOTES

1. The category of number in pronouns can be also represented by means of a feature geometry (Harley and Ritter 2002). In Harley and Ritter's feature geometric approach, number features are privative (i.e., not bivalent).

2. See Harbour (2014) for a more recent number theory and number features.

3. The second- and third-dual pronouns *vidva* and *onidva* have the same syntactic structure except for the difference in the person features of the P node.

4. The third-person dual pronouns *won-a-j* and *won-e-j* have the structure identical to their first- and second-person counterpart in that they are composed of the pronominal stem won- and the dual suffix -j. The vowels *a* and *e* are thematic vowels showing masculine versus non-masculine gender.

5. For more details on labialization and diphthongization of the allophone [ɨ] in Upper and Lower Sorbian, see Schaarschmidt (1998).

6. To my knowledge, it is not exactly clear which phonological rule applied to account for the phonological change from /u/ to /e/ in Contemporary Lower Sorbian. More research is needed to identify this rule.

7. Topolińska (1974) and Stone (1993) note that the emergence of the new phoneme /ə/ in Kashubian was due to shift from /i/ to /ə/ in the word initial position. According to Stone (1993), the new phoneme /ə/ was first attested at the end of the seventeenth century.

8. The second-person dual form *va* postulated in Proto-Slavic by Sussex and Cubberley (2006) is not syncretic with the second-person plural form *vy*.

9. I assume that Sussex and Cubberley (2006) suggest nominative/accusative case syncretism only for the second person since the pronominal stems *vě* and *na* are phonologically different in the first person.

Morphosyntactic Feature Economy and Reanalysis

In this chapter, I present the principle of Morphosyntactic Feature Economy and argue that it provides a principled explanation for the two different patterns of diachronic change which occurred in the Slavic dual pronouns. In the first pattern of diachronic change, the dual in Old Slovenian and Old Sorbian was reanalyzed as a bimorphemic structure and continued to be used by contemporary speakers of both languages. In the second pattern, the dual in Old East Slavic and Kashubian was "lost," that is, it was reanalyzed as the plural.

6.1 MORPHOSYNTACTIC MARKEDNESS OF FEATURE VALUES OF THE DUAL

The notion of morphological markedness is often difficult to define and can be approached differently in morphological theory.[1] Broadly defined, morphological markedness is "the asymmetric treatment of two categories within an opposition where equal patterning might otherwise be expected" (Nevins 2011, 417).[2] In current morphological theory, we can identify three types of morphological markedness: (i) category-internal markedness (Greenberg 1966), (ii) feature markedness (Harley and Ritter 2002), and (iii) feature value markedness (Nevins 2008, 2011).

Category-internal markedness proposed by Greenberg (1963) has to do with co-occurrence restrictions within a certain morphological category. According to this approach to markedness, a marked category implies the presence of an unmarked one. In his famous Universal 34, Greenberg suggests that "no language will have a dual number unless it also has a plural number" (1963).

Feature markedness (Harley and Ritter 2002) is expressed via a node-counting metric which measures terminal nodes or dependency relations in

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a feature-geometric representation of a grammatical category. According to this approach, a feature combination of a category is marked if it has more nodes/dependency relations in its feature-geometric representation. For example, the dual is more marked than the singular and plural since the feature-geometric representation of the dual contains a greater number of terminal nodes.

Feature value markedness proposed by Nevins (2008, 2011) is defined as an asymmetrical treatment of one value of a binary morphosyntactic feature. One value of a binary feature can be marked in regard to the morphosyntactic context in which it occurs. Morphosyntactic markedness of feature values entails that a feature with a marked value can be either the target or trigger for neutralization. In the case of the dual/plural syncretism in Slavic, the marked [-augmented] feature (whose feature value is marked) is the target for deletion.[3]

Following Nevins (2008, 2011), I adopt feature value markedness to determine markedness status of the morphosyntactic representation of the dual. According to a feature value markedness approach, the values of the [-singular -augmented] feature combination of the dual are subject to context-free and context-sensitive markedness statements. The result of the application of these markedness statements is that in the dual the co-occurrence of a marked [-singular] feature with a marked [-augmented] feature makes this combination morphosyntactically marked (102b).

(102)   Number Feature Combinations of the Singular, Dual, and Plural (Noyer 1997)
      a.   Singular   [+singular -augmented]
      b.   **Dual**   **[-singular -augmented]**
      c.   Plural   [-singular +augmented]

Let us consider markedness of values of the [±singular] and [±augmented] features in more detail. I assume (Nevins 2008, 2011) that the [±singular] feature is subject to a context-free markedness statement (103). Since the [+singular] feature occurs only in one context, in the singular, it is unmarked. The [-singular] feature is marked regardless of the context in which it occurs—in the dual or in the plural (table 6.1).

Table 6.1   Morphosyntactic Markedness of Values of the Number Features

Number	+/–Singular	+/–Augmented
a. Singular	**+**sg = unmarked	−aug = marked
b. Dual	**− sg = marked**	**−aug = marked**
c. Plural	−sg = marked	**+**aug = unmarked

(103) **Context-Free Markedness Statement** (Nevins 2011)
The marked value of the [±singular] feature is -.

Neither value of the [±augmented] feature is context-free marked. Markedness of the [±augmented] feature needs to be relativized according to the context in which it occurs. The [±augmented] feature occurs in the context the dual and the plural. Both the dual and the plural possess a marked [-singular] feature. Therefore, the [±augmented] feature is subject to a context-sensitive markedness statement (104). According to the context-sensitive markedness statement (104), when the [±augmented] feature occurs in the context of the marked [-singular] in the dual its feature value is marked. Thus, in the dual the values of the [-singular] and [-augmented] features are marked (105).

(104) Context-Sensitive Markedness Statement (Nevins 2011)
In the context of [-singular] feature, the marked value of the [±augmented] feature is.

(105) Markedness of the Dual [-singular -augmented] Feature Bundle
Dual [-singular $_{marked}$ -augmented $_{marked}$]

In this section, I have presented my theoretical assumptions about feature value markedness and the status of the morphosyntactic representation of the dual in this theory of morphological markedness. Assuming that the [-singular -augmented] feature combination of the dual is marked in Narrow Syntax, I claim that its markedness needs to be resolved post-syntactically at Morphological Structure. In the next section, I argue that two different patterns of diachronic change in the Slavic dual which result from its morphosyntactic markedness are resolved via the application of the principle of Morphosyntactic Feature Economy at Morphological Structure.
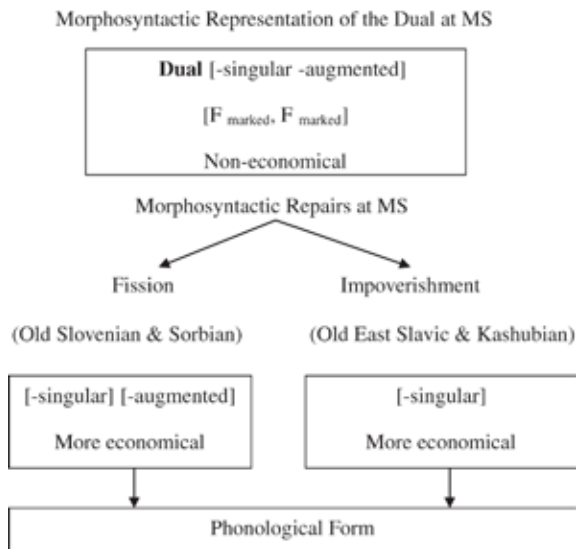
6.2 THE PRINCIPLE OF MORPHOSYNTACTIC FEATURE ECONOMY

The main claim of this book is that the principle of Morphosyntactic Feature Economy is a driving force behind two different patterns of diachronic change which occurred in the Slavic dual (106). In the first pattern of diachronic change, the dual in Old Slovenian and Old Sorbian was not "lost," but reanalyzed and continued to be used by the speakers due to the historical change in (106a). In the second pattern, the dual in Old East Slavic and Kashubian was "lost," that is, it was reanalyzed as the plural (106b).

(106) The Two Patterns of Diachronic Changes in the Slavic Dual
      a). [-singular -augmented] → [-singular] [-augmented] =
          "reanalyzed dual"
      b). [-singular -augmented] →[-singular] = **"plural"**

   I claim that the principle of Morphosyntactic Feature Economy operates on a morphosyntactic representation of the Slavic dual which is marked and computationally inefficient. Assuming that the Faculty of Language (part of our cognitive system) is designed for an optimal computation (Chomsky 2008a,b), I propose that the principle of Morphosyntactic Feature Economy is an interface condition through which the Faculty of Language can maximize its computational efficiency. The principle of Morphological Feature Economy is formulated as follows: a marked [-singular -augmented] feature combination of the dual cannot be realized at Phonological Form without eliminating markedness of its features at Morphological Structure (figure 6.1).[4]
   As schematized in the diagram (figure 6.1), the principle of Morphosyntactic Feature Economy targets a marked [-singular -augmented] feature bundle of the Slavic dual at Morphological Structure before morphosyntactic features are filled with phonological content through Vocabulary Insertion at Phonological Structure. There are two options to make the morphosyntactic representation of the dual less marked and therefore more computationally efficient. One option is to split a marked feature bundle of the dual into two separate terminal nodes via Fission, which happened in Old Slovenian and

Figure 6.1   The Principle of Morphological Feature Economy.

Sorbian. The other option is to delete the [-augmented] feature via a morphological repair operation of Impoverishment, which occurred in Old East Slavic and Kashubian.

According to the first option, a marked morphosyntactic representation of the dual in Old Slovenian and Old Sorbian was split by Fission into two separate terminal nodes—[-singular] and [-augmented], which became less marked and more computationally efficient. As a result of this morphosyntactic repair, a reanalyzed dual continues to be part of the pronominal and verbal agreement systems in Contemporary Standard Slovenian, Contemporary Upper Sorbian, and Contemporary Lower Sorbian. The important point here is that the morphosyntactic structure of the dual in Old Slovenian and Old Sorbian was restructured into two separate terminal nodes by the application of the principle of Morphosyntactic Feature Economy.

According to the second option, a marked morphosyntactic representation of the dual in Old East Slavic and Kashubian was repaired via Impoverishment. The operation of Impoverishment deleted the [-augmented] feature from the [-singular -augmented] feature bundle of the dual which resulted in the syncretism of the dual with the plural by means of sharing the [-singular] feature. The dual/plural syncretism resulted in the replacement of the dual with the plural, which explains the absence of the dual as a grammatical category of number in Contemporary Standard Russian and Contemporary Kashubian.

I argue that the principle of Morphosyntactic Feature Economy which applies to the morphosyntactic representation of the Slavic dual at Morphological Structure is necessary to resolve a morphosyntactically marked and therefore, computationally inefficient [-singular -augmented] feature combination of the Slavic dual. The [-singular -augmented] feature combination puts an additional computational burden on the Language Faculty which is biologically designed to be an optimal solution to the sensory-motor and conceptual-intentional interface conditions (Chomsky 2008a, 135).[5]

Chomsky claims that "language is something like a snowflake, assuming its particular form by virtue of laws of nature—in this case principles of computational efficiency" (2008b, 8). In other words, the Language Faculty is regarded as computationally perfect, and a marked feature combination of the dual is an "imperfection" which stands in the way of computational efficiency. To solve this problem, the principle of Morphosyntactic Feature Economy applies via the morphological repairs at Morphological Structure to make the morphosyntactic representation of the dual less marked and hence more computationally efficient.

The principle of Morphosyntactic Feature Economy, which I proposed to account for the two different patterns of diachronic change in the Slavic dual, makes two important predictions about diachronic change of the dual

cross-linguistically. First, it predicts that if a language has a singular–dual–plural number system, the dual will have a bimorphemic morphological structure. Second, if a language "lost" a dual number, the dual number will be replaced by the plural. The important consequence of the second prediction is that monomorphemic duals should not occur cross-linguistically. Extensive cross-linguistic research is needed to test if the two predictions of the principle of Morphosyntactic Feature Economy are born out.

6.3 THE PRINCIPLE OF MORPHOSYNTACTIC FEATURE ECONOMY AND DIACHRONIC CHANGE

I briefly outline my theoretical assumptions about the principle of Morphosyntactic Feature Economy, Economy Principles which govern language, and diachronic change. Following Chomsky (2005, 2008a, 2008b, 2008c), I suggest that the principle of Morphosyntactic Feature Economy falls within general Economy Principles not specific to the Language Faculty (FL); namely, within "the third factor" principles of efficient computation.

Chomsky (2005, 2008a) suggests that there are "three factors in language design: (1) genetic endowment, which sets limits on the attainable languages, thereby making language acquisition possible; (2) external data, converted to the experience that selects one or another language within a narrow range; (3) principles not specific to FL" (2008 a, 3). It is plausible to believe that the principle of Morphosyntactic Feature Economy belongs to the last category of cognitive principles which reduce computational burden in a syntactic derivation.

According to Chomsky (2005), the "third factor" principles of language design refer to language-independent principles of structural architecture and computational efficiency. Chomsky (2005, 2008a) argues that principles of computational efficiency apply to all living organisms including language which is a biological system. Principles of computational efficiency imply that all biological systems are structured and organized in the most efficient way.

Language, as a biological system, must optimally satisfies conditions which are imposed by two interfaces—sensorimotor (SM) and semantic/conceptual-intentional (C-I). Chomsky (2008a,b,c) further argues that the two interfaces are asymmetric in their nature and in the roles they play in computational efficiency. The conceptual-intentional interface, that is the language of thought, is more important for efficient computation than the sensorimotor interface. The sensorimotor interface is not crucial for efficient computation since most of phonological systems of various languages "violate principles of computational efficiency, while doing the best they can to satisfy the

problem they face: to map to the SM interface syntactic objects generated by computations that are 'well designed' to satisfy C-I conditions" (Chomsky 2008c, 136). The key observation about the C-I interface is that it is designed for optimization of computational efficiency of mapping of syntactic objects to C-I.

The Principle of Morphosyntactic Feature Economy which I propose belongs to the "third factor" principles of efficient computation in that it simplifies the morphosyntactic representation of the dual at Morphological Structure making this representation more computationally efficient. At any given stage of language evolution, including diachronic change in the Slavic dual, principles of efficient computation apply to optimize linguistic computation. I argue that the Principle of Morphosyntactic Feature Economy, as a principle of efficient computation, accounts for two different patterns of diachronic change in the Slavic dual: (1). its reanalysis in Old Slovenian and Sorbian, and (2). its loss in Old East Slavic and Kashubian.

Before proceeding to explain how the Principle of Morphosyntactic Feature accounts for diachronic changes in the Slavic dual, it is important to discuss how diachronic change is treated in Chomsky's (2008b) Biolinguistic Program. Chomsky (2008b) differentiates two types of change: evolutionary (genomic) change and historical change. Evolutionary change involved some sort of genetic mutation which yielded the operation Merge. Historical change manifests itself only in the "modes of externalization"—morphology and phonology of a language. However, it is not suggested in Chomsky's (2008b) Biolinguistic Program of how diachronic change, which is only expressible in morphology and phonology, comes about and what principles or mechanisms are responsible for it.

Within the Minimalist approach to syntactic (not morphological) diachronic change, it has been extensively argued by van Gelderen (2008, 2009, 2011) that "the third factor" principles, such as Feature Economy is responsible for various stages in language change. Analyzing linguistic cycles, van Gelderen argues that Feature Economy minimizes content of morphosyntactic features in order to maximize computational efficiency of the syntactic derivation. In van Gelderen's (2011) formulation of Feature Economy, semantic features (adjuncts) are reanalyzed by the language learner as interpretable features (specifiers) which can value uninterpretable features (heads). Uninterpretable features (affixes) act as probes in a syntactic derivation; they are most economical and computationally efficient (107).[6]

(107) Feature Economy (van Gelderen 2011, 17)
       Minimize the semantic and interpretable features in the derivation:

Adjunct	Specifier	Head	Affix
semantic >	[iF] >	[uF] >	[uF]

Within the framework of Distributed Morphology, the principles of Economy as a driving force of diachronic change have not received not very much attention in the literature. Noyer (1997) suggests that diachronic change in language can be accounted for by gain or loss of filters, which are formulated as co-occurrence restrictions on morphosyntactic features. For example, Classical Arabic has a filter *[1dual] which is assumed by a child acquiring this language. The filter *[1 dual] will impoverish the morphosyntactic representation "first dual" agreement node by neutralizing it with a "first plural" agreement node. The problem with this approach is that such filters seem to be stipulated and do not stem from any underlying principle governing language.

In his most recent work, Calabrese (2011) suggests that diachronic change in morphology can be brought about by marking statements which are activated or deactivated in a specific language.[7] For example, an active marking statement *[+plural, +dual] characterizes a marked morphosyntactic feature configuration of the dual as "costly" in terms of general principles of Language Economy. This marking statement triggers a morphological repair operation which replaces the dual with the plural. Calabrese further suggests that the reasons for morphological marking statements might be in "the way in which functional or cognitive considerations are expressed in grammatical terms (through morphological features)" (2011, 291).[8]

In sum, the principle of Morphosyntactic Feature Economy which I have proposed in this book gives an insight into how the Faculty of Language "deals" with marked morphosyntactic "imperfections" in order to maximize its computational efficiency. It provides a principled explanation for the two patterns of diachronic change in the Slavic dual: continued use of the dual in Slovenian and Sorbian and "loss" of the dual in Russian and Kashubian.

6.4 THE REANALYSIS OF THE OLD SLOVENIAN DUAL IN CONTEMPORARY STANDARD SLOVENIAN

In this section, I show how the principle of Morphosyntactic Feature Economy was applied to the Old Slovenian dual to produce a new and reanalyzed form of the dual in Contemporary Standard Slovenian. Approximately in the sixteenth century, the Old Slovenian dual became very unstable as a grammatical category (Derganc 1988, 2003; Jakop 2008). I argue this instability of the Old Slovenian dual was due to the morphosyntactic markedness of its morphosyntactic representation.

At the end of the sixteenth century, Slovenian literary tradition began to take roots with the translation of the *Bible* (1584) by Jurij Dalmatin. This

event marked the formal establishment of Standard Slovenian language as there was considerable variation in many of the Slovenian dialects (Greenberg 2008). As the Dalmatian's (1584) translation of the *Bible* shows, the first-, second-, and third-person dual pronouns appeared to be syncretic with their plural counterparts.

Whenever instances of the dual/plural *my*, *vy*, *ona* syncretism occur in the *Dalmatian Bible* (1584), verbal suffixes indicate dual reference. For example, the first-person dual pronoun *my*, which appears in the plural form, triggers dual agreement marked by the suffixes -*va* and -*a* (108). The second-person pronoun dual *vy* (syncretic with the plural) occurs with the dual form of the verb "be" and the dual suffix -*a* which indicate dual reference (109). Likewise, the third-person pronoun *ona* induces dual agreement marked by the dual form of the verb "be" and the dual suffix -*a* (110).

(108) Old Slovenian (sixteenth century)
    My bo-**va** letu mejʃtu konzha-l-**a** . . .
    1.**PL** be-1.**DU**.FUT this place destroy-PART-**DU**.MASC
    "We two will destroy this place. . ."

(Jakop 2010, 363; *Dalmatian Bible* 1584: 1 Ms 19.13)

(109) Old Slovenian (sixteenth century)
    Vy, **ʃta** me v' neʃrezho pèrpravi-l-**a** . . .
    2.**PL** be.2.**DU**.PAST me in accident get-PART- **DU**.MASC
    "You two got me into trouble . . ."

(Jakop 2010, 363; *Dalmatian Bible* 1584: 1 Ms 34.30)

(110) Old Slovenian (sixteenth century)
    Inu **ona ʃta** bi-l-**a** oba-dva nagá
    and 3.**PL.MASC** be.3.**DU**.PAST be- PART-**DU**. MASC both-two naked
    "And they two were both naked."

(Jakop 2010, 367; *Dalmatian Bible* 1584: 1 Ms 2.25)

As I have argued, the morphosyntactic representation of the dual is more marked than that of the plural. Recall that in the morphosyntactic representation of the dual [-singular -augmented], the value of the [-augmented] feature is marked in the context of a marked [-singular] feature. In contrast, in the feature representation of the plural [-singular +augmented], the value of the

D
D   Num
[-sg -aug]
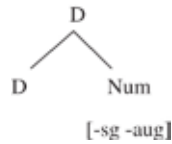
Figure 6.2   The Marked Structure of the Old Slovenian Dual Before Fission.

[+augmented] feature is unmarked. Thus, the [-singular -augmented] feature combination of the dual is morphosyntactically marked and its markedness needs to be eliminated.

I propose that the solution to the problem of reducing markedness of the Old Slovenian dual lies in the application of the principle of Morphosyntactic Feature Economy. At Morphological Structure, Old Slovenian dual pronouns *my*, *vy*, *oni* were represented by the combination of the [-singular -augmented] features whose feature values were marked (figure 6.2).

The principle of Morphosyntactic Feature Economy applied to the marked feature combination of the Old Slovenian dual to eliminate a marked feature bundle of the dual. I propose that a Fission rule split the marked feature combination of the Old Slovenian dual into two terminal nodes—[-singular] and [-augmented] (111).

(111) Fission Rule for the Old Slovenian Dual (sixteenth century):
        [-singular -augmented] → [-singular] [-augmented]

As a result of Fission, two separate terminal nodes were created in the morphosyntactic structure shown in (figure 6.3). The Number node which hosted the marked [-singular -augmented] feature combination was split into Num_1 with [-singular] feature and Num_2 with the [-augmented] feature. The resultant morphosyntactic structure is less marked and therefore is more computationally efficient (figure 6.3).

After the rule of Fission (111) had split the morphosyntactic combination of the Old Slovenian dual into two terminal nodes, Vocabulary Insertion applied to realize the two positions of exponence with phonological content.

D
D   Num
Num₁   Num₂
[-sg]   [-aug]
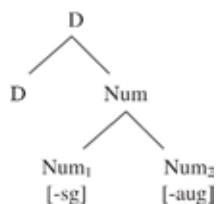
Figure 6.3   A Reanalyzed Old Slovenian Dual After Fission.

Two Vocabulary Items were needed to fill two positions of exponence created by Fission (112). The [-singular] feature was filled by Vocabulary Items /mi/, /vi/, or /ona/ (the plural pronominal stems). The [-augmented] feature was realized by the numeral *dva* ("two") as the only minimal non-singular VI which contains no non-atomic proper subsets.

(112) VIs for the Old Slovenian Dual Pronouns
　　　　/mi/, /vi/, or /ona/ ↔ Num [-singular]
　　　　/dva/ ↔ Num [-augmented]

　　The result of application of the principle of Morphosyntactic Feature Economy in Old Slovenian is a reanalyzed bimorphemic structure of the pronominal dual. Interestingly, evidence of a reanalyzed morphosyntactic structure of the Old Slovenian dual is found in the *Dalmatian Bible* (1584), the same manuscript where the "old" dual forms also occur. As the data (113–115) show, the reanalyzed dual pronouns *my-dva*, *vy-dva*, *ona-dva* consist of a plural pronominal stem *my*, *vy*, *ona,* and the numeral *dva* ("two"). Importantly, the verbs in (113–115) are marked by the dual suffixes *-va* and *-ta* to show agreement with the first-, second-, and third-person reanalyzed dual pronouns.

(113) Old Slovenian (sixteenth century)
　　　　Oſtani-te tukaj, dokler **my-dva** supet k'vam pride-**va**
　　　　stay-IMP here until 1.PL-**two** to 2.PL.DAT return-1.DU.PRES
　　　　"Stay here until we two come back to you."

> (Jakop 2010, 363; *Dalmatian Bible* 1584: 2 Mz 2.14)

(114) Old Slovenian (sixteenth century)
　　　　Vy-dva bo-**ta** rejs ta Kelih py-l-**a**
　　　　2. PL- two be-2.DU truly this chalice drink-PAST-MASC.DU
　　　　"You two will truly drink from this chalice."

> (Jakop 2010, 363; *Dalmatian Bible*, Mr 10.39)

(115) Old Slovenian (sixteenth century)
　　　　kadar **ſta ona-dva** bi-l-a na Puli
　　　　when be.2.DU.PAST 3.PL.MASC-**two** be-PAST-DU.MASC on field
　　　　"When they two were in the field . . ."

> (Jakop 2010, 364; *Dalmatian Bible*, 1 Mr 4.8)

Table 6.2   Dual Pronouns in Contemporary Standard Slovenian

Num/Person	Nom	Acc	Gen	Loc	Dat	Instr
DL						
1.	mi-dva, mi-dve/me-dve	na-ju			na-ma	
2.	vi-dva, vi-dve/ve-dve	va-ju			va-ma	
3.	ona-dva, oni-dve/one-dve	nji-ju			nji-ma	

Since the sixteenth century, the first-, second-, and third-person-reanalyzed Slovenian dual pronouns *midva*, *vidva*, and *onadva* have become part of the grammatical system in Contemporary Standard Slovenian (table 6.2). The major diachronic change which occurred in the number system of Slovenian pronouns was the morphosyntactic reanalysis of the Slovenian dual as a less marked and more computationally efficient dual (116).

(116)   Morphosyntactic Reanalysis of the Slovenian Dual
        "marked" [-singular,-augmented] → [-singular] [-augmented] **"less marked"**

As I have argued in this section, the principle of Morphosyntactic Feature Economy was the driving force behind the morphosyntactic reanalysis of the Slovenian dual. A singular/dual/plural number system of Old Slovenian pronouns was reanalyzed at Morphological Structure via Fission which created a less marked and more economical dual in Contemporary Standard Slovenian (117–118).

(117)   Old Slovenian Pronoun Number System
        Singular [+singular -augmented]
        Dual   [-singular -augmented]
        Plural   [-singular +augmented]
(118)   **Contemporary Standard Slovenian Pronoun Number System**
        Singular [+singular -augmented]
        Dual   [-singular] [-augmented]
        Plural   [-singular +augmented]

6.5 THE REANALYSIS OF THE OLD SORBIAN DUAL IN CONTEMPORARY UPPER AND LOWER SORBIAN

In this section, I present my theoretical account which explains the reanalysis of the Old Sorbian dual. I argue that the principle of Morphosyntactic Feature Economy applied to a marked [-singular -augmented] morphosyntactic

representation of the Old Sorbian dual to reduce its markedness. The case of the Old Sorbian dual is very similar to the Old Slovenian dual in that both languages employed the same morphosyntactic strategy of Fission which resulted in less marked and more computationally efficient representation of the dual.

In the sixteenth century, Old Sorbian dual pronouns became syncretic with their plural counterparts as evidenced by the following data (119–120). The verbs in (119–120) are marked by the dual suffixes *-moj* and *-taj* to indicate agreement with the subject in the first and second person and dual number. The important point here is that the verbal agreement suffixes *-moj* and *-tai* reflect dual reference of the subject pronouns.

(119) Old Sorbian (sixteenth century)
    My chze-**moj** so, schtoz . . .
    1.PL want- 1.DU.PRES REFL COMP
    "We two want to . . ."

                                         (Derganc 1998, 52)

(120) Old Sorbian (sixteenth century)
    Wy widz-i-**tai** a schlysch-i-**tai**
    1.PL see-TH-2.DU.PRES and hear- TH-2.DU.PRES
    "You two see and listen."

                                         (Derganc 1998, 50)

I claim that the dual/plural pronominal syncretism shown in (119–120) is a strong indication of markedness of the [-singular -augmented] feature bundle which represents the Old Sorbian dual at Morphological Structure. At Morphological Structure, the terminal Number Node hosts a marked [-singular -augmented] feature combination of a dual pronoun (figure 6.4). For an agreement to occur, the dual number features [-singular -augmented] are copied to an Agreement node (AGR) within the verbal structure (figure 6.5). The morphological evidence for the presence of a marked [-singular -augmented] feature bundle of the dual at Morphological Structure is the dual agreement suffixes *-moj* and *-taj*.
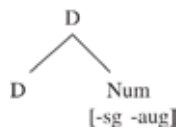

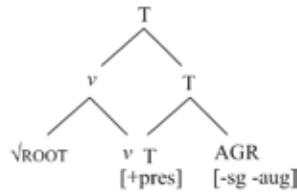**Figure 6.4   The Structure of an Old Sorbian Dual Pronoun at MS.**

Figure 6.5   **The Structure of an Old Sorbian Dual Verb at MS.**

The dual/plural syncretism of the first and second pronouns *my* and *vy* shown in (119–120) is the result of Vocabulary Insertion via underspecification at Phonological Structure. Since both the dual [-singular -augmented] and plural [-singular +augmented] share the [-singular] feature, they can be realized by the same Vocabulary Items via underspecification. The Vocabulary Item /ty/ (second person singular) gets inserted into the [+singular] context as a more specific Vocabulary Item while the Vocabulary Items /my/ (first person), or /wy/ (second person) are completely underspecified (121).

(121)   Vocabulary Items for Old Sorbian Pronouns
       /ty/ → Num [+singular]
       /my/ or /wy/ → elsewhere

In terms of acquisition of number features, I suggest that when the dual/plural pronominal syncretism emerged in Old Sorbian, the speaker was getting evidence of markedness of the [-singular -augmented] feature bundle of the dual. At this point, the same syncretic Vocabulary Item specified as [-singular] for both the dual and plural was an input into the acquisition process. The [-singular] feature could trigger both dual and plural agreements which were problematic for a language learner. Therefore, this conflict in agreement had to be resolved.

I argue that the Principle of Morphosyntactic Feature Economy applied to solve the dual/plural syncretism which posed an acquisition problem. Similar to the Old Slovenian dual, a [-singular -augmented] representation of the Old Sorbian was marked (figure 6.6). A Fission rule applied to the marked feature bundle of the dual to split it into separate terminal nodes (122).
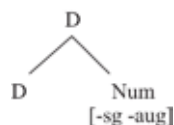

Figure 6.6   **The Marked Structure of the Old Sorbian Dual Pronoun before Fission.**
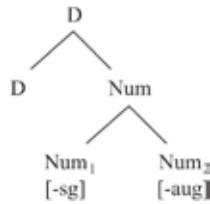
Figure 6.7   A Reanalyzed Old Sorbian Dual After Fission.

(122)   Fission Rule for the Old Sorbian Dual
        [-singular -augmented] → [-singular] [-augmented]
        As a result of Fission, a marked [-singular -augmented] feature bundle
        hosted by the Number node was split into two separate terminal
        number nodes—Num_1 with the [-singular] feature and Num_2 with the
        [-augmented] feature (figure 6.7). The reanalyzed structure of the Old
        Sorbian dual became less marked and therefore more computationally
        efficient.

   After the morphological repair of Fission took place at Morphological
Structure, Vocabulary Insertion occurred to fill the two terminal nodes Num_1
and Num_2 with phonological material. As in the case with Old Slovenian, two
Vocabulary Items were needed to fill two positions of exponence created by
Fission (123). The Vocabulary Items /me/ (first person), /we/ (second person),
or /won/ (third person), the plural pronominal stems, were inserted in the
[-singular] context. The Vocabulary Item /j/, the dual suffix, was inserted in
the [-augmented] context since it is the only possible non-singular exponent.[9]

(123)   VIs for the Old Sorbian Dual Pronouns
        /me/, /we/, or /won/ ↔ Num [-singular]
        /j/ ↔ Num [-augmented]

   As I have shown, the monomorphemic Old Sorbian dual which was syn-
cretic with the plural underwent a historical reanalysis (124). As a result of
this morphosyntactic reanalysis, a reanalyzed bimorphemic dual emerged
which was less marked and more economical for syntactic computation.

(124)   Morphosyntactic Reanalysis of the Sorbian Dual
        "marked" [-singular -augmented] → [-singular] [-augmented] **"less
        marked"**

   We find examples of reanalyzed dual pronouns in one of the most important
Old Sorbian texts of the sixteenth century, *Jakubica's New Testament* (1548).
The first-, second-, and third-person dual pronouns *me-y*, *we-y, wone-y* have a

bimorphemic morphological structure which consists of a plural pronominal
stem *me, we, wone* and the dual suffix -*y* (125–127).

(125) Old Sorbian (sixteenth century)
       Me-y . . . moʃche-**mey**
       1.**PL**-**DU** can-1.**DU**.PRES
       "We two can."

                                                              (Unger 1998, 57)

(126) Old Sorbian (sixteenth century)
       Moʃche-**tey we**-**y** pytz . . .
       can-2.**DU**.PRES 2.**PL**-**DU** drink
       "You two can drink . . ."

                                                              (Unger 1998, 57)

(127) Old Sorbian (sixteenth century)
       A **wone**-**y** knomu reknuʃch-**tey** . . .
       and 3.**PL**-**DU** to him tell-3.**DU**.PRES
       "And they two answer him . . ."

                                                              (Unger 1998, 58)

In the nineteenth century Lower Sorbian, we find evidence of reanalyzed
bimorphemic dual pronouns which consist of the plural pronominal stems
me- and *we*- and the dual suffix -*j* (128–129). In the examples given below
(128–129), the dual reference of the first person and second person dual pro-
nouns *mej* and *wej* is confirmed by the dual agreement suffixes -*mej* and -*tej*.

(128) Lower Sorbian (nineteenth century)
       Me-j gledach-**mej** wójadnom jaden na drugego.
       1.**PL**-**DU** look-1.**DU**.AOR. together one on other
       "We two looked at each other."

                                        (*Bramborski Serbski Casnik* 1852:25,
                                         Doldoserbski Tekstowy Korpus)

(129) Lower Sorbian (nineteenth century)
       We-j stej grońi-l-**ej**
       2.**PL**- DU be.2.**DU** say-PERF-2.**DU**
       "We two have said."

                                        (*Bramborski Serbski Casnik* 1850:04,
                                         Doldoserbski Tekstowy Korpus)

Table 6.3 Bimorphemic Nominative Dual Pronouns in Contemporary Upper and Lower Sorbian

Num/Person	Upper Sorbian	Lower Sorbian
DU		
1.	mó-j	me-j
2.	wó-j	we-j
3.	won-a-j	won-e-j

In Contemporary Upper and Lower Sorbian, dual pronouns continue to be part of the grammar of these two languages (table 6.3). As I have argued in this section, the reason for the renewal of dual pronouns in the grammar of Sorbian is a more economical morphosyntactic structure of the dual at Morphological Structure.

In sum, the principle of Morphosyntactic Feature Economy is the underlying reason for diachronic change in the Sorbian dual pronouns. The pronominal system of Old Sorbian used to have a marked [-singular -augmented] feature bundle of the dual (130b). A reanalyzed pronominal number system in Contemporary Upper & Lower Sorbian retained the dual since it was reanalyzed into a more economical morphosyntactic structure with two terminal nodes: [-singular] and [-augmented] (131b).

(130) Old Sorbian Pronoun Number System
      a. Singular   [+singular -augmented]
      b. Dual   [-singular -augmented]
      c. Plural   [-singular +augmented]

(131) Contemporary Upper & Lower Sorbian Pronoun Number System
      a. Singular   [+singular, -augmented]
      b. Dual   [-singular] [-augmented]
      c. Plural   [-singular +augmented]

6.6 THE REANALYSIS OF THE NINETEENTH-CENTURY KASHUBIAN DUAL AS PLURAL IN CONTEMPORARY KASHUBIAN

The Kashubian dual underwent a different diachronic change compared to its Slovenian and Sorbian counterparts. Unlike Slovenian and Sorbian, in which the dual continued to "survive" since it was reanalyzed as bimorphemic, the Kashubian dual was "lost" since it was replaced by the plural (table 6.4). I argue that the principle of Morphosyntactic Feature Economy is responsible for the morphosyntactic reanalysis of the Kashubian dual as plural.

Table 6.4   The Evolution of the Kashubian Dual Pronouns

Number/Person	19th Century Kashubian (Ceynowa 1860)	Kashubian in the 1950s (Stone 1993)	21st Century Kashubian (Hopkins 2001)
DU			
1.	ma	ma	–
2.	va	–	–
3.	wón-ji, wón-e	–	–
PL			
1.	me	më	më
2.	ve	wa	wa
3.	wón-ji, wón-e	oni, onë	woni, wone

Similar to the Slovenian and Sorbian dual, the Kashubian dual was represented by a marked [-singular -augmented] feature combination at Morphological Structure (figure 6.8). This markedness led to the dual/plural syncretism which occurred approximately in the middle of the twentieth century. The dual/plural syncretism had to be resolved via the principle of Morphosyntactic Feature Economy which applied at Morphological Structure via the operation of Impoverishment.

The operation of Impoverishment deleted a marked [-augmented] feature in the context of a marked [-singular] feature assuming context-sensitive markedness of the [±augmented] feature (Nevins 2008, 2011) (132). As a result of the application of the Impoverishment rule, the Kashubian dual retained only the [-singular] feature in its morphosyntactic representation (figure 6.9).

(132)   Impoverishment Rule for Kashubian:
        [-augmented] → ∅/ Num [-singular]
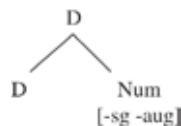
Figure 6.8   The Marked Structure of the Kashubian Dual at MS.

Figure 6.9   The Kashubian Dual after Impoverishment at MS.

I suggest that after the rule of Impoverishment (132) deleted the [-augmented] feature in the morphosyntactic structure of the dual, the Kashubian speaker of the next generation did not have enough morphological evidence to posit the other "+" value of the [augmented] feature. Due to the lack of distinction in the acquisition input, I suggest that the entire [±augmented] feature was deleted via Impoverishment (133).

(133)   Impoverishment of the [±augmented] in Kashubian
        [±augmented] → ∅

As a result of Impoverishment of the [±augmented] feature, the Kashubian pronouns were distinguished only by the [±singular] feature at the Morphological Structure. Postsyntactic Vocabulary Insertion applied to fill the terminal nodes of the [±singular] feature. Assuming with Embick (2010) that Vocabulary competition is local, that is, it occurs at a single terminal node, Vocabulary Items competed to realize [+singular] terminal node.

There were two VIs which were in competition for Vocabulary Insertion at the [+singular] terminal node /të / and /wa/ (134). The VI /të/ won the competition and got inserted in the [+singular] context as it is more specific. The VI /wa/ (second person) is the elsewhere items whose context in non-specified.[10]

(134)   VIs for Kashubian Pronouns
        /të / → Num [+singular]
        /wa/ → elsewhere

The application of the principle of Morphosyntactic Feature Economy provides a principled explanation why the singular–dual–plural number system, which Kashubian pronouns used to have, was replaced by the singular–plural number system which emerged in contemporary Kashubian (135–136). Due to markedness of the [-singular -augmented] feature combination of the dual, the [±augmented] feature was deleted. As a result, only one bivalent [±singular] feature was left to distinguish the singular from the plural in Kashubian.

(135)   Kashubian Pronoun Number System (nineteenth to twentieth century)
        Singular   [+singular -augmented]
        Dual   [-singular -augmented]
        Plural   [-singular +augmented]
(136)   Contemporary Kashubian Pronoun System
        Singular   [+singular]
        Plural   [-singular]

6.7 THE REANALYSIS OF THE OLD
EAST SLAVIC DUAL AS PLURAL

The "fate" of the dual in Old East Slavic is very similar to that of Kashubian. In the eleventh century, the Old East Slavic dual showed the first signs of morphosyntactic instability due to the dual/plural syncretism in its pronominal system. By the fifteenth to sixteenth centuries, the Old East Slavic dual was lost; i.e. it was reanalyzed as plural (137b). I argue that the application of the principle of Morphosyntactic Feature Economy is the reason for the reanalysis of the Old East Slavic dual as plural.

(137) The Two Patterns of Diachronic Changes in the Slavic Dual
  a). [-singular,-augmented] → [-singular] [-augmented] =
   "reanalyzed dual"
  b). [-singular,-augmented] →[-singular] = **"plural"**

First, I present the analysis of the diachronic changes which occurred in the second person dual since the second person dual showed the dual/plural syncretism much earlier than the first person dual. As early as in the eleventh century, the Old East Slavic dual *vy* began to syncretize with the plural in the second person (138). Despite the dual/plural pronominal syncretism, the second person dual agreement suffix *-ta* was very robust, i.e. the verb was always marked by the dual suffix *-ta* in the second person.

(138) The Old East Slavic Dual in the eleventh Century
  ҜГО ЖҜ ВЫ ГЛ҃ЄТА ꙖКО СЛѢПЪ РОДИСꙖ
  jego že **vy** gle-**ta** jako slěpŭ rodi-sę
 3.SG.ACC EMPH 2.PL.NOM say-2.DU.PRES as blind born-REFL
 "You two say that he was born blind."

            (*Archangel Gospel*, 9.1)

Assuming (Nevins 2008, 2011) that the dual is represented by a marked [-singular -augmented] feature combination in narrow syntax, I suggest that the Old East Slavic dual had a marked morphosyntactic structure in narrow syntax (figure 6.10). In the [-singular -augmented] representation of the Old East Slavic dual both number features are marked.

The evidence for the [-singular -augmented] representation of the Old East Slavic dual in narrow syntax is in the fact that the dual number features [-singular -augmented] are copied from the Num node (figure 6.10) to an AGR node at Morphological Structure (figure 6.11). In the MS structure of the verb *gle-**ta*** marked by the dual agreement suffix *-ta*, the AGR node has
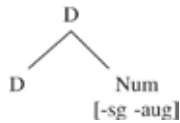
Figure 6.10   **The Marked Structure of the Old East Slavic (11th century) Dual in Narrow Syntax.**
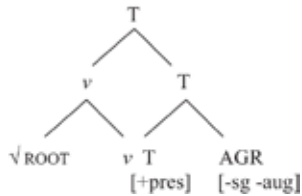
Figure 6.11   **The Structure of an Old East Slavic Verb gle-ta with AGR at MS.**

the copied dual number feature [-singular -augmented]. At Phonological Form the dual agreement features are phonologically realized by the verbal suffix -ta, which we observed in the above example (138).

I claim that dual/plural *vy* syncretism was the consequence of markedness of the narrow syntactic representation of the Old East Slavic dual. At Phonological Form, the dual/plural *vy* syncretism was the result of underspecifation of Vocabulary Items. There were two Vocabulary Items competing to realize the [+singular] terminal node (139). The Vocabulary Item /ty/ was inserted in the [+singular] context since it was more specific. The Vocabulary Item /vy/ was the elsewhere item.

(139)   VIs for the Old East Slavic Dual Pronouns
           /ty/ → Num [+singular]
           /vy/ → elsewhere

In the eleventh to fourteenth centuries, the Old East Slavic dual *vy* continued to be syncretic with the plural in the second person. I argue that during this time period, the principle of Morphosyntactic Feature Economy had not yet applied to the marked [-singular -augmented] representation of the Old East Slavic dual at Morphological Structure. The operation of Impoverishment had not yet deleted the offending [-augmented] feature from the [-singular -augmented] feature bundle.

The argument for the non-application of the principle of Morphosyntactic Feature Economy to the Old East Slavic dual in the eleventh to fourteenth centuries is supported by the presence of the dual agreement suffix *-ta* marked on Old East Slavic verbs, such as *gle-ta*. As I have shown above, the

dual number feature combination [-singular -augmented] was copied to an
AGR node at Morphological Structure, and was phonologically realized as
the dual agreement suffix *-ta*. The dual/plural syncretism was simply resolved
via underspecification.

By the fifteenth century, the second person dual *vy* was already reanalyzed
as plural since the Old East Slavic verb was marked by the second person
plural agreement suffix *-te* (140). I argue that by the fifteenth century the
principle of Morphosyntactic Feature Economy had already applied via the
operation of Impoverishment. The rule of Impoverishment deleted the [-aug-
mented] feature in the context of a marked [-singular] feature at Morphologi-
cal Structure (141).

(140) The Old East Slavic Dual Reanalyzed as Plural in the Fifteenth
       Century
       е́ же въı гла́те а́нтр́та
       ego že **vy** gl-**te** antixrŭsta
       3.SG EMPH 2.PL say-2.PL.PRES antichrist
       "You two say that he is an antichrist."

                                                      (*Radzivilow Codex* 103.2)

(141) Impoverishment Rule for Old East Slavic (end of the fifteenth century):
       [-augmented] → ∅/ Num [-singular]

The result of the application of the principle of Morphosyntactic Feature
Economy in the fifteenth century Old East Slavic is a diachronic change
from the dual to plural. The morphosyntactic structure of a reanalyzed Old
East Slavic dual as plural is shown in (figure 6.12). In the morphosyntactic
structure (figure 6.12), the terminal Number node retained only the [-singular]
feature similarly to Kashubian. The Old East Slavic pronoun *vy* was no longer
represented by the [-singular -augmented] feature combination, but already
had an impoverished [-singular] morphosyntactic representation.

The reanalysis of the Old East Slavic dual as plural and its impover-
ished [-singular] representation is supported by the plural agreement suffix
-te marked on the verb, such as *gle-**te***. At Morphological Structure, the
[-singular] feature of the Number node is copied to an AGR node within the
verbal structure (figure 6.13). The AGR node with the copied [-singular] fea-
ture is then realized by the VI /te/ at Phonological Structure.

I argue that the principle of Morphosyntactic Feature Economy is the rea-
son for the reanalysis of the Old East Slavic first person dual *my* as plural.
The principle of Morphosyntactic Feature Economy applied via the opera-
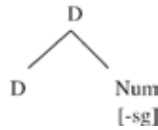tion of Impoverishment at Morphological Structure. The marked [-singular

```
        D
       / \
      D   Num
          [-sg]
```

Figure 6.12 The Change from Old East Slavic Dual to Plural after Impoverishment at MS.

```
            T
           / \
          v   T
         / \   / \
    √ROOT  v T  AGR
          [+pres] [-sg]
```
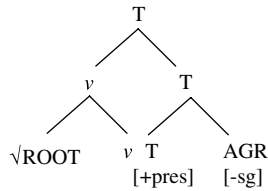
Figure 6.13 The Structure of an Old East Slavic Verb gle-te with AGR at MS.

-augmented] representation of the first person dual *my* was impoverished to retain only the [-singular] feature, which became less marked.

Unlike the second person dual *vy*, which became syncretic with the plural in the eleventh century, the first person dual *vě* did not syncretize with the plural until the end of the fifteenth century (cf. 142–143). Up until the end of the fifteenth century, the first person dual *vě* had dual reference which is confirmed by the dual agreement suffix *-vě* marked on the verb (143).

(142) The first Person Dual *vě* (end of the fourteenth century)

вѣ послевѣ к брату своєму
vě posle-**vě** k bratu svojemu
1.DU.NOM send-1.DU.PRES to brother own
"We two will send to our brother."

(*Laurentian Codex* 58.2)

By the end of the fifteenth century, the dual/plural *my* syncretism emerged, but there were instances where the verb was still marked by the dual suffix *-vě* (143). I suggest that the reason for the lack of dual/plural syncretism until the fifteenth century is the phonological difference in the dual pronominal stem *vě* and plural stem *my*.

(143) The First Person Dual *my* (end of the fifteenth century)

Мы послевѣ ко бра^тсвоєму
my posle-**vě** ko bratu svojemu
1.PL.NOM send-1.DU.PRES to brother own

"We two will send to our brother."

<div align="right">(*Radziwiłł Codex* 101.1)</div>

I argue that in the instances where the first person dual was syncretic with the plural, but the verb still retained the first person dual agreement suffix *-vě* , the principle of Morphosyntactic Feature Economy did not apply to the marked [-singular -augmented] feature bundle of the dual. The evidence for this is the presence of the dual suffix *-vě* marked on the verb.

I assume that similar to the second person dual, the dual/plural *my* syncretism is the result of markedness of the [-singular -augmented] feature bundle of the first person dual in narrow syntax (figure 6.14). The evidence for the [-singular -augmented] structure of the first person dual in narrow syntax is the addition of the AGR node with the copied [-singular -augmented] number features phonologically realized as the suffix *-vě* (figure 6.15).

After the AGR node was adjoined to the morphosyntactic structure, Vocabulary Insertion applied and this node was phonologically realized by the suffix *-vě*. The dual/plural *my* syncretism was resolved via underspecification of Vocabulary Items (144).

(144)   VIs for the Old East Slavic Dual Pronouns
        /ja/ → Num [+singular]
        /my/ → elsewhere

By the end of the fifteenth century, the first person the Old East Slavic dual *my* underwent reanalysis as plural (145). I argue that by this time in the
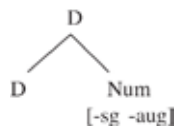

Figure 6.14   The Marked Structure of the 1st Person Dual in Narrow Syntax.
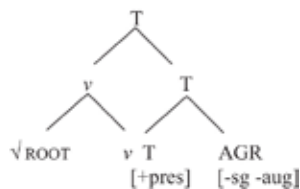

Figure 6.15   The Structure of an Old East Slavic Verb posle-vě with AGR at MS.

development of Old East Slavic, the principle of Morphosyntactic Feature Economy had applied since the verb bears the plural agreement suffix *-mŭ*.

(145) The First Person Dual *my* (end of the fifteenth century)
       мꙑ вѣдаємъ
       my vŭdae-**mŭ**
       1.PL know-1.PL.PRES
       "We (two) know."

                     (*Radziwiłł Codex* 103.2)

The principle of Morphosyntactic Feature Economy applied via the operation of Impoverishment, which deleted the marked [-augmented] number feature in the context of the marked [-singular] feature (146). The result of Impoverishment was reanalysis of the dual as plural since only the [-singular] number feature was hosted by the Number node (figure 6.16). Thus, the first person dual was reanalyzed as plural.

(146) Impoverishment Rule for Old East Slavic (end of the fifteenth century):
       [-augmented] → ∅/ Num [-singular]

The reanalysis of the first person dual as plural is evidenced by the plural agreement suffix on the verb. At Morphological Structure, the [-singular] feature was copied to an AGR node which was phonologically realized by the suffix *-mŭ* (figure 6.17).

The principle of Morphosyntactic Feature Economy was a driving force for the morphosyntactic reanalysis of the Old East Slavic dual as plural, at the end of the fifteenth century. As a result, the singular–dual–plural pronominal number system of Old East Slavic was reanalyzed as a singular–plural system in Contemporary Standard Russian (147–148). The only feature which distinguishes singular and plural pronouns in Contemporary Standard Russian is [±singular].

(147) Old East Slavic Pronoun Number System

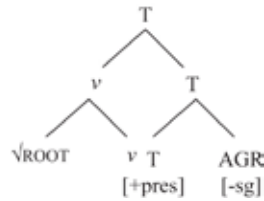**Figure 6.16 The Change from Old East Slavic Dual to Plural after Impoverishment at MS.**

Figure 6.17   The Structure of an Old East Slavic Verb vǔdae-mǔ with AGR at MS.

Singular	[+singular -augmented]
Dual	[-singular -augmented]
Plural	[-singular +augmented]

(148) Contemporary Standard Pronoun Number System

Singular	[+singular]
Plural	[-singular]

6.8 CONCLUSION

In this chapter, I have argued that the principle of Morphosyntactic Feature Economy provides a principled explanation for the two patterns of diachronic change of the Slavic dual within the framework of Distributed Morphology. I have shown that the principle of Morphosyntactic Feature Economy applied to a marked [-singular -augmented] representation of the Slavic dual via the morphological repairs of Fission and Impoverishment. The reason for these repairs was elimination of the marked [-singular -augmented] feature combination of the Slavic dual.

In Old Slovenian and Old Sorbian, the principle of Morphosyntactic Feature Economy applied via Fission to split the morphosyntactic feature bundle of the dual into two separate terminal nodes—[-singular] and [-augmented]. As a result, markedness of the feature bundle was eliminated, and the dual was restructured as bimorphemic in contemporary Slovenian and Sorbian. In Old East Slavic and Kashubian, the principle of Morphosyntactic Feature Economy applied via Impoverishment whereby the [±augmented] feature was deleted. Due to the deleted [±augmented] feature, markedness of the [-singular -augmented] feature combination was eliminated, and contemporary Russian and Kashubian employ a singular–plural pronominal number system.

NOTES

1. Haspelmath (2006, 26) identifies as many as 12 senses of markedness. None out of these 12 senses are assumed here.

2. The concept of markedness of grammatical categories goes back to Jakobson who pointed out that "the asymmetry of correlative grammatical form can be characterized as the antinomy of signalization of A and non-signalization of A" (1984, 12). Jakobsonian notion of markedness has to do with specification versus non-specification of a semantic distinction in a grammatical category.

3. The pervasive case, person, and gender syncretisms show that in Slavic languages, the dual is also the trigger for deletion of case, person, and gender features.

4. In figure 6.1, F stands for a morphosyntactic feature.

5. This statement is known as the Strong Minimalist Thesis (SMT) in Chomsky's Minimalist Program (Chomsky 2008a).

6. In her most recent work *The Linguistic Cycle: Language Change and the Language Faculty* (2011), van Gelderen analyzes the reasons for linguistic cycles. She argues that in a linguistic cycle uninterpretable features are again "renewed" by semantic ones.

7. Calabrese (2008) suggests that economy of morphosyntactic representations can also be achieved through feature addition, and not just through feature deletion or fission as I present in the book.

8. For further details on functional or cognitive motivations behind morphological marking statements, see Calabrese (2011).

9. As I have discussed in chapter 5, in Sorbian, the dual suffix *-j* historically stems from the numeral *dwaj* ("two").

10. Vocabulary Insertion of the first person VI / më / would proceed in the same way. The context for insertion would indicate the first-person features instead of the second-person features.

Chapter 7

Conclusion

7.1 THE ROLE OF MORPHOSYNTACTIC FEATURE ECONOMY IN THE EVOLUTION OF THE SLAVIC DUAL

In this book, I have addressed the issue of the loss and preservation of dual number in Slavic languages. I have proposed a new theory of language change motivated by Morphosyntactic Feature Economy set in the frameworks of Distributed Morphology and Biolinguistics. In my analysis of the Slavic dual, I have particularly focused on dual pronouns and verbal agreement. I have attempted to answer the question of why the majority of Slavic languages lost dual pronouns while three—Slovenian, Upper Sorbian, and Lower Sorbian—did not. Interestingly, dual pronouns in these languages did not remain unchanged in their morphological structure, but were reinvented by the speakers. Instead of keeping monomorphemic forms of dual pronouns, the speakers of Slovenian, Upper Sorbian, and Lower Sorbian have invented new bimorphemic dual forms made up of a plural pronominal base and the numeral *two* or a dual agreement suffix. The rest of the Slavic languages simply resorted to the replacement of the dual by the plural.

I have shown that the reason for two different patterns of diachronic change in the Slavic dual pronouns possibly lies in derivational and computational economy of human language as a biological system. I have argued that the principle of Morphosyntactic Feature Economy proposed in this book is one of the factors of diachronic change in the category of number in Slavic languages. Specifically, I have suggested that Morphosyntactic Feature Economy can optimize a morphosyntactic representation of dual number at Morphological Structure before Spell-Out and restructure its features via repair operations.

I suggest that language change in the Slavic number system in the pronominal domain is driven by Morphosyntactic Feature Economy via reanalysis. Over time, speakers of different branches of the Slavic languages had to reanalyze the marked representation of the dual as a simpler and more economical one. They gave preference to a more economical and less computationally burdensome linguistic structure. In the case of Slovenian, Upper Sorbian, and Lower Sorbian, morphological fission split the morphosyntactic structure of the dual into two "morphemes." In the rest of the Slavic languages, impoverishment deleted an offending marked feature of the dual which resulted in the replacement of the dual by the plural.

I suggest that the reason for two different directions of diachronic change in the Slavic languages might be due to the timing of certain stages of the process. For example, I have shown that in Old East Slavic dual/plural syncretism has approximately occurred in the eleventh century while in Slovenian and Sorbian it started happening only in the sixteenth century. I speculate that this difference has to do with the spread of Protestantism in Slovenia and Sorbian in the sixteenth century and consequently later translations of the *Bible* from German into Slovenian and Sorbian, the native languages of the Slavic people. Other reasons behind two different patterns of diachronic change remain to be found.

I have proposed that the principle of Morphosyntactic Feature Economy is a driving force behind the two different patterns of diachronic change in the Slavic dual. What are the predictions this principle makes for dual pronouns attested cross-linguistically? According to the principle of Morphosyntactic Feature Economy, a marked [-singular -augmented] representation of the dual will be split into two syntactic terminal nodes—[-singular] [-augmented] and realized in a bimorphemic dual form. I have already shown that this hypothesis is borne out in the Slovenian and Sorbian dual pronouns. Will it be borne out in dual pronouns cross-linguistically?

Let us consider some languages with the dual which are typologically unrelated to Slavic. For example, a demonstrative dual pronoun from Manam (Austronesian) has a complex structure which is bimorphemic. It consists of a plural suffix *-di* and a dual suffix *-ru* (149b). Another example of a bimorphemic dual is attested in the nominal dual in Hebrew (Afro-Asiatic) (150). In Manam and Hebrew, the pro/nominal duals are bimorphemic. The plural suffix is encoded by the [-singular] feature, and the dual suffix or number two is encoded by the [-augmented] feature. In combination, both features yield dual number, or referential cardinality of 2.

(149) Manam (Austronesian)
      a. áine ŋara
         woman that
         "that woman"

b. áine ŋara-**di**-a-**ru**
   woman that-3**PL**-EP-**DU**
   "those two women"

c. áine ŋara-di
   woman that-3**PL**
   "those women"

<div align="right">(Nevins 2011, 423)</div>

(150) Hebrew (Afro-Asiatic)
Svu'-ay-im
week-two-**PL**
"two weeks"

<div align="right">(Ritter 1995, 409)</div>

Another example of the distribution of the [-singular] and [-augmented] features can be found in Hopi (151). In Hopi, both the pronominal and nominal duals are "constructed" in that they are encoded by a combination of the [-singular] and [-augmented] features.

(151) Hopi (Uto-Aztecan)
a. Pam **taaqa wari.**
   that man-**SG** run.**SG.PERF**
   "That man ran."
b. **Puma** taaqa-**t wari.**
   those man-**PL** run. **SG.PERF**
   "Those two men ran."
c. **Puma** taa-taq-**t yuʔtu.**
   those **RED**.man-**PL** run.**PL.PERF**
   "Those men ran."

More extensive cross-linguistic analysis of pronominal duals is needed to establish that predictions of the principle of Morphosyntactic Feature Economy hold cross-linguistically. In the future, more research on non-Indo-European languages with dual number is needed to see whether the dual will be lost or reanalyzed as a new form.

7.2 IMPLICATIONS

This research study of the Slavic dual has important implications for linguistic theory and cognitive science. The investigation of diachronic changes in the Slavic dual analyzed in this book shows that language change can be

motivated by economy factors which are biological in nature and are external to human language as a specialized cognitive system. Morphosyntactic Feature Economy is one such factor that has a biological foundation. It sheds light on how grammatical categories might develop over time. While I have shown how the dual has evolved in Slavic languages, more research studies are needed to see how the dual develops over time in non-Indo-European languages. We have seen that economy factors play a significant role in language change; therefore, they should be investigated in other branches of linguistics and cognitive science.

Appendix A

Abbreviations

ACC	accusative
AGR	agreement
AOR	aorist
AUG	augmented
C	complementizer
CI	Conceptual Interface
CP	complementizer phrase
DAT	dative
DM	Distributed Morphology
Det	Determiner
DP	determiner phrase
DU	dual
FEM	feminine
FUT	future tense
GEN	genitive
IMPF	imperfective
INF	infinitive
INH	inherent
INSTR	instrumental
INT	internal
K	case
LF	Logical Form
LOC	locative
MASC	masculine
MS	Morphological Structure
N	noun
NEG	negative

NOM	nominative
NS	Narrow Syntax
NUM	number
P	person
PART	participant
PCT	past participle
PERF	perfective
PF	Phonological Form
PL	plural
PAST	past
PRES	present
PRO	pronoun
QUANT	quantificational
REFL	reflexive
SG	singular
SPR	speaker
STRUC	structural
T	tense
TH	theme vowel
TP	tense phrase
v	"small" v
vP	"small" verb phrase
V	verb
VI	vocabulary item
VOC	vocative
VP	verb phrase

Appendix B

Orthographical Systems and Transliteration Symbols

Old Church Slavic and Old East Slavic

Cyrillic	*Transliteration Symbol*
а	a
Б	b
в	v
г	g
д	d
є	e
ж	ž
ѕ, ꙃ	dz
ꙁ	z
н	i
ı	i
(м)	g
к	k
л	l
м	m
н	n
о	o
п	p
р	r
с	s
т	t
оу	u
ф	f

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Cyrillic	Transliteration Symbol
Ҳ	x
ɯ	w
Ц	c
Ү	č
Ш	š
Щ	št
Ъ	ŭ
ЪІ	y
Ь	ĭ
Ѣ	ě
Ю	ju
Ꙗ	ja
Ѥ	je
Ѧ	ę
Ѩ	ję
Ѫ	ǫ
Ѭ	jǫ
Ѱ	ps
Ѳ	f
Ѵ, Ү	i, v

Slovenian

A, a	Lj, lj
B, b	M, m
C, c	N, n
Č, č	Nj, nj
D, d	O, o
Dž, dž	P, p
E, e	R, r
F, f	S, s
G, g	Š, š
H, h	T, t
I, i	U, u
J, j	V, v
K, k	Z, z
L, l	Ž, ž

Russian

Cyrillic	Transliteration Symbol
А, а	a
Б, б	b
В, в	v
Г, г	g
Д, д	d
Е, е	e
Ё, ё	ë
Ж, ж	ž
З, з	z
И, и	i
Й, й	j
К, к	k
Л, л	l
М, м	m
Н, н	n
О, о	o
П, п	p
Р, р	r
С, с	s
Т, т	t
У, у	u
Ф, ф	f
Х, х	x
Ц, ц	c
Ч, ч	č
Ш, ш	š
Щ, щ	š č
Ъ, ъ	″
Ы, ы	̖y
Ь, ь	
Э, э	é
Ю, ю	ju
Я, я	ja

Upper and Lower Sorbian

A, a	N, n
B, b	ń
C, c	O, o
Č, č	ó
D, d	P, p
Dź, dź	R, r
E, e	ř, ŕ
ě	S, s
F, f	Š, š
G, g	Ś, ś
H, h	T, t
Ch, ch	Ć, ć
I, i	U, u
J, j	W, w
K, k	y
Ł, ł	Z, z
L, l	Ž, ž
M, m	Ź, ź

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