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Affixation

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Introduction

Affixation is a morphological process whereby a bound morpheme, an affix, is attached to a morphological base. Diachronically, the English word *affix* was first used as a verb and has its origin in Latin: *affixus*, past participle of the verb *affigere*, *ad-* 'to' + *figere* 'to fix'. Affixation falls in the scope of Morphology where bound morphemes are either roots or affixes. Prefixes (affixes that precede the root) and suffixes (affixes that follow the root) are the most common types of affixes cross-linguistically. Affixes mark derivational (-*er* in *teach-er*) and inflectional (-*s* in *teacher-s*) changes, and affixation is the most common strategy that human languages employ for derivation of new words and word forms. However, languages vary in the ways they express the same semantics, and if in English the noun *biolog-ist* is derived from *biology* through the addition of the suffix *-ist*, in Russian (and other Slavic languages) the same derivation does not involve the addition of an affix but subtraction of form: *biolog-ija* 'biology' → *biolog* 'biologist'. Most languages make an extensive use of affixes (most European, African, Australian, and Amerindian languages are of this type), whereas others (e.g., Vietnamese), hardly do. In languages that use affixes, there is a general preference for suffixes over prefixes.

General Overviews

Affixation is a major morphological device, and a book-length study that provides an overview of affixation is, as a rule, not titled affixation but morphology; that is, all morphology textbooks are actually general overviews of the topic of affixation. Of the older sources, Nida 1949 introduces a very accessible morpheme analysis and defines most of the affix types known in present-day morphological theory. The more recent sources are allotted into three groups: Textbooks for Beginners, Intermediate-Level Textbooks, and Advanced-Level Textbooks.

Nida, E. 1949. *Morphology: The descriptive analysis of words*. Ann Arbor: Univ. of Michigan Press.

This book can be seen as a predecessor of all modern morphology textbooks. It is written within the framework of American structuralist linguistics to which issues related to identification of affixes appear central.

Textbooks for Beginners

The textbooks listed in this section assume only very basic prior knowledge. Aronoff and Fudeman 2010 is a theory-neutral textbook, while Lieber 2010 presents a syntactic approach to morphology.

Aronoff, M., and K. Fudeman. 2010. *What is morphology?* 2d ed. Malden, MA: Blackwell.

A good starting point on how to do morphological analysis and identify affixes. This theory-neutral book has two editions and is often used as a textbook for university courses in morphology.

Lieber, R. 2010. *Introducing morphology*. Cambridge, UK: Cambridge Univ. Press.

After a theory-neutral introduction to the basics of morphology, the book ends with a chapter that provides a theoretical perspective on what has been learned.

Intermediate-Level Textbooks

The textbooks included in this section are more comprehensive and also more theory-oriented in comparison to those listed in the previous section. Bauer 2003 pays special attention to a number of morphological theories. Szymanek 1998 and Booij 2012 are generative-morphology textbooks. Haspelmath 2002 discusses different theoretical proposals but can be seen as theory neutral.

Bauer, Laurie. 2003. *Introducing linguistic morphology*. 2d ed. Edinburgh, UK: Edinburgh Univ. Press.

An accessible and comprehensive introduction to morphology and morphological analysis by a morphologist who does not identify himself with a particular framework but considers different theoretical proposals. Provides one of the most detailed descriptions of types of affixes in the literature.

Booij, G. 2012. *The grammar of words: An introduction to linguistic morphology*. 3d ed. Oxford: Oxford Univ. Press.

Written by a theorist interested in phenomena in the morphology–syntax interface, this introduction to morphological analysis emphasizes the role of words in understanding morphology.

Haspelmath, M. 2002. *Understanding morphology*. New York: Oxford Univ. Press.

A comprehensive introduction to morphology by a typologist, defender of an a-theoretical approach to linguistics. A coauthored expanded second edition has been published recently but the 2002 edition is more frequently cited, informally referred to as “Haspelmath’s morphology.”

Szymanek, Bogdan. 1998. *Introduction to morphological analysis*. 3d ed. Warsaw, Poland: PWN.

A clearly structured and easy-to-follow introduction to morphological analysis with a special part on affixation; draws primarily on data from English and Polish, though other languages are also presented. This is maybe the most cited East European morphology textbook in West Europe and North America.

Advanced-Level Textbooks

The titles in this section have a strong theoretical orientation. Plungian 2003 is written in Russian and considers the western European and North American linguistic traditions along with the Russian sources. Spencer 1991 and Fabregas and Scalise 2012 are entirely focused on the theoretical findings of the research carried out in western Europe and North America.

Fabregas, Antonio, and Sergio Scalise. 2012. *Morphology: From data to theories*. Edinburgh Advanced Textbooks in Linguistics 2. Edinburgh: Edinburgh Univ. Press.

This textbook pays special attention to the morphology–syntax interface, including recent developments in construction grammar and the Minimalist program. In the discussions of the topics, references to sources are sparse, but there are lists of suggestions for further reading at the end of each chapter.

Plungian, Vladimir. 2003. *Obščaja morfologija: Vvedenie v prblematiku*. Moscow: Editorial URSS.

This textbook of general morphology consists of two parts: (1) basic concepts in morphology and (2) semantics of grammatical categories. Written by a typologist, the book draws on examples from various languages. A revised version of the second part titled *Vvedenie v grammatičeskuju semantiku* was published as a separate book in 2011 (Moscow: RGGU).

Spencer, A. 1991. *Morphological theory: An introduction to word structure in generative grammar*. Oxford: Blackwell.

A well-known advanced-level source that covers a number of theoretical proposals, but, as it was written more than 20 years ago, it does not include the most recent theories (e.g., construction grammar). It is therefore recommended to use this book along with Fabregas and Scalise 2012.

Handbooks

As a rule, morphology handbooks do not have special chapters on affixation. However, since affixes are markers of morphological operations and occur in derivation, inflection, and compounding, various chapters in a morphology handbook provide information pertinent to affixation. Booij, et al. 2000–2004 is a very comprehensive source and contains much information on affixation. All chapters in Spencer and

Zwicky 1998 tackle issues relevant to affixation. Štekauer and Lieber 2005 is on affixation in word formation.

Booij, G., C. Lehmann, and J. Mugdan, eds. 2000–2004. *Morphologie: Ein internationales Handbuch zur Flexion und Wortbildung/Morphology: An international handbook on inflection and word formation*. Vols. 1 and 2. Berlin: de Gruyter.

This very comprehensive handbook contains articles written in English and German. Many chapters are highly relevant to affixation (e.g., morphological operations, markedness, zero suffixation, iconicity). There are also special articles on the different Types of Affixes such as infixes, transfixes, and so on.

Spencer, A., and A. Zwicky, eds. 1998. *The handbook of morphology*. Oxford: Blackwell.

The articles of the first handbook of morphology are written by leading specialists and cover different aspects of affixation, but there is no special chapter on the topic.

Štekauer, P., and R. Lieber, eds. 2005. *Handbook of word formation*. Dordrecht, The Netherlands: Springer Dordrecht.

This book tackles issues related to affixation in word formation, primarily derivational morphology, within various theoretical frameworks, generative and nongenerative alike.

Glossaries

Almost all of the textbooks cited under General Overviews contain glossaries in which all terms necessary for understanding affixation can be found. Additionally, there is a special glossary of morphology (Bauer 2004) that can be very helpful as it provides more detailed definitions and contains a selected bibliography. The SIL Glossary of Linguistic Terms is another nice resource.

Bauer, L. 2004. *A glossary of morphology*. Washington, DC: Georgetown Univ. Press.

This glossary gives clear and exhaustive definitions of virtually all terms in current morphology, including all affixation-related terminology.

SIL Glossary of Linguistic Terms.

A good online glossary of linguistics that lists all terminology relevant to affixation.

Reference Resources

All encyclopedias of language and linguistics contain entries on affixation. The articles on affixation in the encyclopedias listed in this section are all fairly long and clearly structured. The entries in Asher 1994 and Brown 2006 are particularly profound. The article on affixation in Strazny 2005 contains a special section on affixes and headedness. Another helpful resource that can be consulted on specific problems is *The World Atlas of Language Structures* (Haspelmath, et al. 2005).

Asher, R. E. 1994. *The encyclopedia of language and linguistics*. Oxford: Pergamon.

A ten-volume set. The article on affixation titled "Affixation as a Means of Word-Formation" is written by Laurie Bauer and discusses various types of affixes.

Brown, K. 2006. *Encyclopedia of language and linguistics*. 2d ed. Boston: Elsevier.

A fourteen-volume set. The article on affixation is written by Andrew Carstairs-McCarthy and has a special part on the origin of affixes in a language.

Haspelmath, M., M. S. Dryer, D. Gil, and B. Comrie. 2005. *The world atlas of language structures*. Oxford: Oxford Univ. Press.

This highly innovative work with a great number of maps does not have a chapter on affixation but can be used as a source of information on specific issues such as the use of suffixes and prefixes in inflection, inflectional exponence, and so on. An interactive online version is also available.

Strazny, Philipp. 2005. *Encyclopedia of linguistics*. 2 vols. London: Routledge.

A two-volume encyclopedia. The article on affixation is written by Pius ten Hacken, who discusses headedness in an item-and-arrangement account of morphology; see the sections on Item-and-Arrangement versus Item-and-Process and Headedness.

Dictionaries, Databases, and Corpora

Empirical research on morphology relies on dictionaries, databases, and corpora, among other things. However, in comparison to the electronic resources available for syntax-oriented research and word-level analyses, there are only very few corpora and databases annotated at a morpheme level, such as Baayen, et al. 1995; the Corpus e Lessico di Frequenza dell'Italiano Scritto; and the Russian National Corpus, which allow a search for affixes. Morpheme-level annotations of large corpora are still seldom since they are difficult to perform and, in addition, significantly slow down the computational processing of the corpus data. Thus as electronic resources for research on affixation currently serve either electronic

versions of standard dictionaries, such as *The Oxford English Dictionary* 2004 or *Digitales Wörterbuch der Deutschen Sprache*, or small morpheme-annotated databases and corpora. All corpora, databases, and electronic dictionaries can, as a rule, be searched with wildcards. A wildcard is usually marked by an asterisk (*), which stands for a letter or string of letters and replaces part of either the beginning or end of a word. Xiao 2009 and Ostler 2009 provide information about the existing corpora of well-studied and lesser-studied languages, respectively. The major corpora of English include the British National Corpus as well as Corpus of the Contemporary American English. Another helpful resource for English is OneLook.

Baayen, R. Harald, Richard Piepenbrock, and Leon Gullikers. 1995. *CELEX lexical database*. CD-ROM. Linguistic Data Consortium, Univ. of Pennsylvania.

Morphologically annotated database. Contains general lexicons for English, German, and Dutch. The user guides can be accessed online. There is also an interactive Web-based CELEX lexicon but it is not completely reliable.

British National Corpus.

A representative resource on British English, both spoken and written. The BNC project is managed by the BNC consortium and maintained by the University of Oxford.

Corpus e Lessico di Frequenza dell'Italiano Scritto (CoLFIS)

A well-balanced corpus of written Italian with an annotated lexicon for search of derivational affixes.

Corpus of Contemporary American English (COCA).

This is the largest freely available corpus of English and the only large and balanced resource on American English. COCA is maintained by Brigham Young University.

Digitales Wörterbuch der Deutschen Sprache.

An online dictionary that allows different search options and can be used for research on affixation in German.

OneLook.

This is a neat online resource that has indexed over 1,000 English glossaries and dictionaries and allows for different wildcard searches.

Ostler, Nicholas. 2009. Corpora of less studied languages. In *Corpus linguistics: An international handbook*. Edited by Anke Lüdeling and Merja Kytö, 457–483. Berlin: Walter de Gruyter.

Introduces corpora of lesser-studied languages and discusses the problems related to their collection.

Russian National Corpus.

The corpus has Russian and English versions and allows for a word-formation search. However, the latter is available only in the Russian version and is still under development.

***The Oxford English dictionary*. 2004. 2d ed. 20 vols. Oxford: Oxford Univ. Press.**

Considered the most important reference resource for English. Provides information about the history of individual words as well as their present-day meanings. Contains about 600,000 words and three Mio quotations and is available in print, on CD-ROM, and online.

Xiao, Richard. 2009. Well-known and influential corpora. In *Corpus linguistics: An international handbook*. Edited by Anke Lüdeling and Merja Kytö, 383–456. Berlin: Walter de Gruyter.

Introduces over 100 corpora of well-studied languages.

Special Resources on Individual Languages

Except for research and as reference resources for morphology classes, some of the dictionaries listed in this section can also be used to facilitate the acquisition of the second/foreign language vocabulary of learners of English and Russian. As Quinion 2002, Stein 2007, and Cubberley 1994 provide semantic definitions of affixes, the reader is also advised to consult the section Mapping Meaning and Form. Quinion 2002 and Stein 2007 list the English affixes, while Cubberley 1994 is a similar resource for Russian. Kuznetsova and Efremova 1986, Tikhonov 1985, and Zaliznjak 1977 are all on Russian and more abstract in the sense that they are more specialized and list affixes without semantics.

Cubberley, Paul. 1994. *Handbook of Russian affixes*. Columbus, OH: Slavica.

Written in English, this book defines the majority of the Russian prefixes and suffixes by their semantics and combinability, the latter with reference to the type of bases to which the affixes attach.

Kuznetsova, Ariadna I., and Tatjana F. Efremova. 1986. *Slovar' morfem russkogo jazyk*. Moscow: Russkij jazyk.

This is a morpheme dictionary in which one can search for prefixes and suffixes. The dictionary lists the

combinations of an affix with all other affixes as well as all roots to which a particular affix or affix combination attaches. It is a nice resource on affixation in Russian.

Quinion, Michael. 2002. *Ologies and isms: Word beginnings and endings*. Oxford: Oxford Univ. Press.

This work lists all English affixes and contains over 1,250 entries and their semantics, illustrated by some 10,000 examples. An interactive online version is available online.

Stein, G. 2007. *A dictionary of English affixes: Their function and meaning*. Munich: Lincom.

Gives semantic definitions of all English affixes; affixes that derive the same meaning are listed together.

Tikhonov, A. N. 1985. *Slovoobrazovatel'nyj slovar' russkogo jazyka*. 2 vols. Moscow: Russkij jazyk.

This is a word-formation dictionary of Russian organized in terms of word-formation nests; that is, it lists roots and all possible (affixal) derivatives from them, step-by-step. The name of the author has alternative spellings as Tihonov or Tixonov.

Zaliznjak, Andrej A. 1977. *Grammatičeskij slovar' russkogo jazyka: Slovoizmenenie*. Moscow: Izdatel'stvo 'Russkij jazyk'.

Gives all Russian inflectional patterns and thus all the affixes that mark inflection. In the lexicon, every lexeme is indexed for inflectional pattern, and since lexemes terminating in the same way usually inflect the same, the lexicon is organized as a reverse dictionary.

Journals and Special Issues

There are two peer-reviewed journals that are exclusively devoted to morphology, *Morphology* and *Word Structure*. Most publications in these journals tackle issues related to affixation. Important articles on various aspects of affixation have also appeared in *Natural Language & Linguistic Theory (NLTT)*, *Linguistics*, and *Language*. *NLTT* publishes primarily research couched within the generative paradigm. *Linguistics* is a theory-neutral general linguistic journal. *Language*, the journal of the Linguistics Society of America, has the ambition to publish articles that are of interest to the whole linguistic community. Two special issues of *Morphology*, Manova and Aronoff 2010 and Aronoff and Manova 2010, have been devoted to affix ordering. Manova 2011 is a special issue of *Word Structure* that discusses the relation between affixes and bases.

Aronoff, Mark, and Stela Manova, eds. 2010. *Special Issue: Affix Combinations, Part 2. Morphology*

20.2.

Along with Manova and Aronoff 2010, this special issue constitutes the first-ever collection of papers on affix ordering in typologically diverse languages.

Language.

The journal of the Linguistics Society of America, which publishes articles in all disciplines of linguistics.

Linguistics.

Publishes articles in the traditional disciplines of linguistics, including morphology. Published by de Gruyter.

Manova, Stela, ed. 2011. *Special Issue: Affixes and Bases. Word Structure 4.2.*

This special issue introduces the notion of affix-based morphology; this is when affixes are combined without relation to a lexical base. It is claimed that affix combinations, like morphological stems (or morphemes), are hard to generate syntactically and provide evidence for independence of morphology.

Manova, Stela, and Mark Aronoff, eds. 2010. *Special Issue: Affix Combinations, Part 1. Morphology 20.1.*

This is the first part of a collection of papers on affix ordering in typologically diverse well-studied and lesser-studied languages.

Morphology.

Published by Springer, this journal is the successor of the *Yearbook of Morphology* and devoted to morphology proper and its interfaces. Two of its special issues focus on affixation, Manova and Aronoff 2010 and Aronoff and Manova 2010.

Natural Language & Linguistics Theory.

A platform for generative studies on the syntax, semantics, phonology, and the lexicon of natural language. Published by Springer.

Word Structure.

The scope of this journal is similar to that of the journal *Morphology*. *Word Structure* is published by Edinburgh University Press. One special issue is devoted to affixation, Manova 2011.

Theoretical Issues

This section discusses a number of theoretical issues pertinent to the proper understanding of affixation: Item-and-Arrangement versus Item-and-Process approaches to morphology; the concepts of Markedness and Headedness; Features and Exponence; the Mapping Meaning and Form in affixation; Subanalysis, which assumes the existence of units smaller than morphemes; and Derivation versus Inflection, that is, the nature of the different affixes in the word form. In the different subsections, a number of theories are explained, such as A-morphous morphology, construction morphology, distributed morphology, minimalist morphology, natural morphology, nanosyntax, paradigm function morphology, realizational morphology, and split morphology.

Item-and-Arrangement versus Item-and-Process

Affixation usually means addition of an affix, as in *book-s*, the plural of *book*. Affixations such as *books* are easy to account for in terms of compositional rules of the type *book+-s*. In morphology, this analysis is known as the item-and-arrangement approach (Hockett 1954). However, not all affixations are of the *book-s* type (e.g., *mice*, the plural of *mouse*, and *sheep*, the plural of *sheep*), do not contain additional affixes, and are thus hard to derive in terms of item-and-arrangement. Thus an alternative approach was suggested that assumes derivation by process and is therefore called item-and-process. The latter approach does not necessarily need morphemes and appears to be the predecessor of the so-called a-morphous morphology (Anderson 1992). Morphological phenomena that are most frequently explained in terms of item-and-process are conversion, as in *to cut—a cut* (Bauer and Valera 2005), and subtraction, as in the Russian derivation *psixologija* ‘psychology’—*psixolog* ‘psychologist’ (Manova 2011). The alternative term for conversion is zero derivation and implies an item-and-arrangement analysis with addition of a zero suffix (Marchand 1974; i.e., *to cut* → *a cut* + -Ø). Zero is a controversial type of affix, and in derivational morphology many linguists speak of conversion instead of zero suffixation; see the discussion in Bauer and Valera 2005. In inflection, the term *syncretism* is used for the description of cases in which two forms coincide because no overt affix attaches. There is also the term *zero exponence*; see Trommer 2012, cited under Features and Exponence. As regards subtraction, the situation with respect to terminology is even worse (Manova 2011): There are a number of competing terms, one of which, namely *disfixation*, is built by analogy with the term *affixation*. Manova 2011 maintains that even subtraction can be treated in terms of item-and-arrangement.

Anderson, Stephen 1992. *A-morphous morphology*. Cambridge, UK: Cambridge Univ. Press.

Rejects the existence of morphemes in the classical sense (i.e., not morphs and morphemes but word-forms are the basic building blocks). Uses processes like apophony, subtraction and metathesis as an argument for a-morphous morphology.

Bauer, Laurie, and Salvador Valera, eds. 2005. *Approaches to conversion/zero-derivation*. New York: Waxmann.

This is the first book-length treatment of conversion in the literature.

Hockett, C. F. 1954. Two models of grammatical description. *Word* 10:210–231.

The author is one of the major representatives of American structuralist linguistics. The article introduces item-and-arrangement and item-and-process models of grammar.

Manova, Stela. 2011. *Understanding morphological rules: With special emphasis on conversion and subtraction in Bulgarian, Russian and Serbo-Croatian*. Dordrecht, The Netherlands: Springer.

Mixes strategies from item-and-arrangement and item-and-process: Conversion is analyzed as a process, though words, stems and roots can undergo conversion; subtraction is treated in terms of item-and-arrangement as the subtracted material is either a morpheme or coincides with an existing morpheme phonologically.

Marchand, Hans. 1974. *Studies in syntax and word-formation: Selected articles, on the occasion of his 65th birthday*. Edited by Dieter Kastovsky. Munich: Fink.

This volume of selected papers contains Marchand's most famous writings on zero suffixation.

Markedness

Markedness is a concept taken from the Prague Linguistic School and was originally proposed to account for phenomena in phonology. The trivial definition of *marked* in morphology reads: a morphological form with an overt marker for a particular category (feature in other frameworks, see Features and Exponence); for example, *-s* in *book-s* is the marker of the category [+pl]. Formal markedness (the addition of *-s*) implies semantic markedness (the addition of the feature [+pl]). This is, however, not always the case; for example in *sheep—sheep* [+pl], the second *sheep* is marked semantically but lacks a formal marker. According to Battistella 1996, markedness follows universal logic, which allows establishment of markedness hierarchies of morphosyntactic features (e.g., the hierarchy for gender is masculine < feminine < neuter, meaning that masculine is unmarked relative to feminine and neuter). As demonstrated in Croft 1990 and Ludwig 2001, markedness hierarchies play an important role in morphological typology. Moreover, neglect of markedness relations may lead to doubtful analyses that reject the existence of affixes (morphemes in Anderson 1992's a-morphous morphology, cited under Mapping Meaning and Form). Thus an analysis in terms of subtraction (the reverse of affixation because addition of meaning is marked by subtraction of form, as in Russian *biolog-ija* 'biology'—*biolog* 'biologist' with addition of the feature [+person]) may entirely depend on whether markedness is considered. If we derive *biologija* from *biolog*, the process will be a normal affixation by addition, the reverse direction (i.e., *biologija* → *biolog*) means subtraction. An illustration of the same problem in inflection provide the frequently cited example of subtraction in the formation of French adjectives: /blāš/ → blā/ 'white', /grād/ → /grā/ 'great, large', /lōg/ → /lō/ 'long'. In all these cases the direction of derivation is from feminine to masculine, though semantic markedness requires a masculine-to-feminine direction; recall the gender hierarchy mentioned above. Manova 2011 reviews the examples of subtraction from the literature with a focus on markedness. Tiersma 1982 introduces the concept of markedness reversal; that is, markedness may be context-sensitive. See also Waugh and Lafford 2000 on marked (+) and unmarked (−) features. In morphological

theory, markedness has been extensively discussed in natural morphology (Dressler, et al. 1987; see also Ludwig 2001). Another illustration of application of markedness in current morphology is research in terms of feature geometry (Harley and Ritter 2002, cited under Features and Exponence) within the framework of distributed morphology (Halle and Marantz 1993). Feature geometry like markedness has its origin in phonology. Markedness plays an important role in minimalist morphology too; see Wunderlich and Fabri 1995, cited under Mapping Meaning and Form.

Battistella, Edwin L. 1996. *The logic of markedness*. New York: Oxford Univ. Press.

This book defines a general theory of markedness. It also discusses the applications of markedness in different theoretical frameworks.

Croft, William. 1990. *Typology and universals*. Cambridge, UK: Cambridge Univ. Press.

Markedness is of particular importance to morphological typology, and in this book chapter 4 is devoted to markedness. Chapter 5 discusses grammatical hierarchies of features with respect to markedness (e.g., the hierarchy for number is singular < plural < dual < trial).

Dressler, W. U., W. Mayerthaler, O. Panagl, and W. U. Wurzel. 1987. *Leitmotifs in natural morphology*. Amsterdam: John Benjamins.

This monograph sets up the platform of the theory of natural morphology in which markedness is a principal concept.

Halle, M., and A. Marantz. 1993. Distributed morphology and the pieces of inflection. In *The view from building 20*. Edited by Kenneth Hale and S. Jay Keyser, 111–176. Cambridge, MA: MIT Press.

The foundational work on distributed morphology where markedness is considered in feature-geometry analysis.

Ludwig, R. 2001. Markiertheit. In *Language typology and language universals*. Vol. 1. Edited by Martin Haspelmath, Ekkehard König, Wulf Oesterreicher, and Wolfgang Raible, 400–419. Berlin: Walter de Gruyter.

A fairly detailed review of research on markedness from a typological perspective, with much information on the development of the concept in linguistics, including morphological theory.

Manova, Stela. 2011. *Understanding morphological rules: With special emphasis on conversion and subtraction in Bulgarian, Russian and Serbo-Croatian*. Dordrecht, The Netherlands: Springer.

The chapter on subtraction reviews research on the topic and critically assesses the examples of

subtractive morphology known from the literature. Some of those examples neglect markedness and misinterpret affixation as subtraction, which is then used as evidence for a-morphous morphology; see Anderson 1992, cited under Mapping Meaning and Form.

Tiersma, P. M. 1982. Local and general markedness. *Language* 58:832–849.

Claims markedness reversal for pragmatic reasons. Languages usually mark the plural value of the feature number, but there are situations in which plural appears more natural and is also morphotactically unmarked as opposed to singular (e.g., when we refer to ethnic groups of people).

Waugh, Linda R., and Barbara A. Lafford. 2000. Markedness. In *Morphology. An international handbook on inflection and word-formation*. Vol. 1. Edited by Geert Booij, Christian Lehmann, and Joachim Mugdan, 272–280. Berlin: Walter de Gruyter.

An accessible review of research on markedness, with discussion of controversies about markedness.

Features and Exponence

Affixes are exponents (markers or markings in other frameworks) of morphosyntactic features (see also the section on Markedness). The term *exponence* comes from word-and-paradigm accounts of morphology (Matthews 1972) and denotes the way in which morphosyntactic feature values relate to (affixal) phonological form. Coates 2000 is an article-length review of the research on exponence. Trommer 2012 is a collection of papers on exponence that present state-of-the-art research. Caballero and Harris 2012 is a typology of multiple exponence, a topic not included in Trommer 2012. Morphosyntactic features, as the term implies, has two aspects—morphological and syntactic. Corbett 2012 is an introduction to features and provides the morphological perspective; Adger 2003 is an advanced-level account from the syntactic side, see also Adger's paper in Kibort and Corbett 2010. Combinations of features have been modeled within the framework of distributed morphology in terms of feature geometry (Harley and Ritter 2002 and some of the papers in Trommer 2012). Kibort and Corbett 2010 is a set of papers on features from various theoretical perspectives.

Adger, D. 2003. *Core syntax*. Oxford: Oxford Univ. Press.

Chapter 2 (pp. 22–61) is devoted to morphosyntactic features and provides a syntactic perspective on the issue.

Caballero, Gabriela, and Alice C. Harris. 2012. A working typology of multiple exponence. In *Current issues in morphological theory: (Ir)regularity, analogy and frequency. Selected papers from the 14th International Morphology Meeting, Budapest, 13–16 May 2010*. Edited by Ferenc Kiefer, Maria Ladanyi, and Peter Siptar, 163–188. Amsterdam: Benjamins.

This paper draws on data from ninety-five languages belonging to twenty-five families and gives the first typology of multiple exponence—the occurrence of multiple realizations of a single feature, bundle of features, or derivational category in the same domain.

Coates, Richard. 2000. Exponence. In *Morphology. An international handbook on inflection and word-formation*. Vol. 1. Edited by Geert Booij, Christian Lehmann, and Joachim Mugdan, 616–629. Berlin: Walter de Gruyter.

This overview article explains the use of exponence and synonymous terms such as marker, realization, and so on. It also defines the different types of exponence known in the literature such as cumulative exponence, multiple exponence, extended exponence and tackles theoretical issues pertinent to exponence.

Corbett, Greville. 2012. *Features*. Cambridge, UK: Cambridge Univ. Press.

This is a morphology-oriented introduction to features in a textbook-format.

Harley, H., and E. Ritter. 2002. Person and number in pronouns: A feature-geometric account. *Language* 78.3: 482–526.

This article provides a minimalist account of morphosyntactic features in terms of feature geometry. The analysis is accommodated within the theory of distributed morphology. It also relates morphosyntactic features to fundamental cognitive categories, and its logic is thus similar to that underlying markedness; see the section on Markedness.

Kibort, Anna, and Greville Corbett, eds. 2010. *Features: Perspectives on a key notion in linguistics*. Oxford: Oxford Univ. Press.

This book is a set of papers that discuss features within different theoretical persuasions.

Matthews, P. H. 1972. *Inflectional morphology: A theoretical study based on aspects of Latin verb conjugations*. Cambridge, UK: Cambridge Univ. Press.

This book is usually referred to as the first use of the term *exponence* in morphological theory.

Trommer, Jochen, eds. 2012. *The morphology and phonology of exponence*. Oxford: Oxford Univ. Press.

State-of-the-art research on exponence. The analyses in the different papers are couched within approaches such as optimality theory, distributed morphology, minimalist morphology, and nanosyntax.

Headedness

The notion of headedness comes to morphology from syntax. Roughly, the last added affix in a complex word, whether a suffix or a prefix, defines its category and other features; for example, the head of *help-ful* is the suffix *-ful* and it defines the lexical category (part of speech) of the whole word that is an adjective in this particular case. Headedness is of importance to syntax-like item-and-arrangement accounts of morphology that assume a hierarchical step-by-step composition of complex words. Williams 1981 proposes the right-hand head rule, Selkirk 1982 is a revision of Williams 1981, and Lieber 1981 rejects the right-hand head rule and puts forward the principle of feature percolation as determining the head of a complex word. The notion of headedness seems most relevant to phenomena at the morphology–syntax interface such as compounds and particle verbs for which it is relatively easy to establish the head. When applied to derivation and inflection, headedness appears a problematic concept (Bauer 1990); the problems with headedness in inflectional morphology are also discussed in Stump 2001. Therefore not all morphology textbooks pay attention to headedness. Bauer 1990 is a critical review of the headedness debate in morphology, and Fabregas and Scalise 2012 provides an accessible overview of the research on headedness. State-of-the-art research on headedness in affixation (not mentioned in Fabregas and Scalise 2012) assumes that a morpheme (an affix) does not necessarily correspond to a single head but can lexicalize a structured non-trivial set of heads (see Subanalysis). This type of analysis is typical of the so-called nanosyntax (see Starke 2009 and Taraldsen 2010, cited under Subanalysis).

Bauer, Laurie. 1990. Be-heading the word. *Journal of Linguistics* 26:1–31.

An accessible and well-argued discussion of headedness in compounding, derivation, and inflection. The author reviews the existing research and remains skeptical about the applicability of the notion of head to morphology proper.

Fabregas, Antonio, and Sergio Scalise. 2012. *Morphology: From data to theories*. Edinburgh Advanced Textbooks in Linguistics 2. Edinburgh, UK: Edinburgh Univ. Press.

This advanced textbook of morphology offers a brief but helpful overview of the issues surrounding the adoption of the notion of head in morphology.

Lieber, Rochelle. 1981. *On the organisation of the lexicon*. Bloomington: Indiana Univ. Linguistic Club.

Rejects Williams's right-hand head rule and proposes the principle of feature percolation: The outermost affix, whether prefix or suffix, determines the category of the word and its features, that is, the head of the word can be either the leftmost or the rightmost member. Thus the feature percolation principle explains why *en-large* and *en-case* are verbs in English.

Lieber, Rochelle. 1992. *Deconstructing morphology: Word-formation in syntactic theory*. Chicago: Univ. of Chicago Press.

The rules of word formation are the rules of syntax. Words have hierarchical structure similar to that of syntactic expressions, and the notion of head thus becomes a major issue in morphology.

Selkirk, Elisabeth. 1982. *The syntax of words*. Cambridge, MA: MIT Press.

Revises the right-hand head rule as proposed in Williams 1981. The revision accounts for instances in which the right-hand member of the complex word does not seem to determine the category and other features of the word as a whole as in a particle verb (e.g., *grow up*).

Stump, Gregory T. 2001. *Inflectional morphology: A theory of paradigm structure*. Cambridge, UK: Cambridge Univ. Press.

A lexeme is headed if and only if it is derived by a category-preserving word-formation rule, which allows properties of the base lexeme to persist as properties of the complex lexeme that it defines; that is, *rewrite* is headed (*rewrite* inflects for tense [*rewrote*] in the same way as *write*), while *writer* is unheaded.

Williams, Edwin. 1981. On the notions “lexically related” and “head of a word.” *Linguistic Inquiry* 12:245–275.

Introduces the right-hand head rule: The head of a morphologically complex word is the right-hand member of that word (e.g., the suffix *-ion* is the head of the noun *instruct-ion*).

Mapping Meaning and Form

This section considers the question of whether affixes have semantics. Complex words consist of pieces of structure that are traditionally called morphemes (affixes are morphemes too). Morphology defines morpheme as the minimal unit of language that relates meaning and form. The item-and-arrangement approach (see Item-and-Arrangement versus Item-and-Process) builds on this understanding of morpheme. Research on affix ordering that argues for scopal relations of affixes (see Rice 2000, cited under Syntactic and Semantic Ordering) also treats affixes as meaningful units. However, at least after Aronoff 1976, we know that morphemes do not associate meaning and form perfectly: There are morphemes that seem to have no meaning and morphemes that should be associated with more than one meaning. These problems have led to the development of approaches to morphology that separate form from meaning in the morpheme (Anderson 1992 even denies the morpheme). Such approaches are known as realizational morphology and are the mainstream in the current research on inflectional morphology. Stump 2001 is the most profound articulation of the theory of realizational morphology that sees affixes as markings without semantics. Semantics is assigned at the level of word; this is to every cell of a paradigm. The recently developed construction morphology (Booij 2010) treats affixes in a similar fashion. Affixes are meaningless units that receive semantic interpretation only when used in constructions of words. Lieber 2005, in the spirit of minimalism, argues for minimal semantic specifications of affixes. Distributed morphology (Embick and Noyer 2007), keeps form and semantics together only at an abstract level; that is, morpheme (affix) refers to a syntactic terminal node and its content, not to the

phonological expression of that terminal (e.g., *-s* in *books* and *-en* in *oxen* constitute the same morpheme because they both express the same feature [pl]). The advantages of the distributed morphology approach to meaning are best visible in the so-called feature-geometry analysis (see Harley and Ritter 2002, cited under Features and Exponence). An alternative approach to inflection, the so-called minimalist morphology (Wunderlich and Fabri 1995), assumes that each inflectional affix has its own lexical entry and thus carries and projects categorical information.

Anderson, S. R. 1992. *A-morphous morphology*. Cambridge, UK: Cambridge Univ. Press.

A word-based theory of morphology that denies the existence of morphemes in the classical sense of minimal pairings of meaning and form.

Aronoff, M. 1976. *Word formation in generative grammar*. Cambridge, MA: MIT Press.

One of the foundational works of modern generative morphology. Among other things, this influential book casts doubt on the usefulness of the traditional concept of morpheme.

Booij, Geert. 2010. *Construction morphology*. Oxford: Oxford Univ. Press.

Affixes do not have semantics; they receive semantic interpretation only in constructions of words.

Embick, D., and R. Noyer. 2007. Distributed morphology and the syntax/morphology interface. In *The Oxford handbook of linguistic interfaces*. Edited by G. Ramchand and C. Reiss, 289–324. Oxford: Oxford Univ. Press.

An informative and easy-to-follow outline of the theory of distributed morphology by two of its major proponents. Affixes are abstract units; that is, particular semantics can have more than one affixal phonological realization.

Lieber, R. 2005. *Morphology and lexical semantics*. Cambridge, UK: Cambridge Univ. Press.

Affixes are at least minimally specified in the lexicon.

Rice, K. 2000. *Morpheme order and semantic scope: Word formation in the Athapaskan verb*. Cambridge, UK: Cambridge Univ. Press.

Based on the assumption that semantic derivation mirrors syntactic derivation, this book assigns semantics to every morpheme and provides an analysis in terms of semantic scope. As affixes mark categories, the approach is like that of distributed morphology.

Stump, Gregory T. 2001. *Inflectional morphology: A theory of paradigm structure*. Cambridge, UK: Cambridge Univ. Press.

Affixes are markings without semantics. A lexeme has two paradigms—phonological and syntactic—and every cell in the phonological paradigm is linked with a cell in the syntactic paradigm by paradigm-linkage rules. The syntactic paradigm assigns the meaning, and the phonological gives the form.

Wunderlich, Dieter, and Ray Fabri. 1995. Minimalist morphology: An approach to inflection. *Zeitschrift für Sprachwissenschaft* 14.2: 236–294.

An introduction to minimalist morphology, an approach to inflection comparable to distributed morphology. However, while distributed morphology operates with abstract morphemes, in minimalist morphology concrete morphemes project their categorical information onto complex units; that is, the English plural suffixes *-s* and *-en* are the same suffix in distributed morphology but two different suffixes in minimalist morphology.

Subanalysis

Some studies of morphosyntax operate not only with morphemes but also with parts of morphemes. Müller 2006 terms this type of analysis “subanalysis” and demonstrates it with data from German verb inflection. For a general discussion of submorphemic units in morphology, see Kubrjakova 2000. Submorphemic analyses are at the heart of a newly suggested approach to the architecture of grammar called nanosyntax. Nanosyntax maintains that with the growth of the syntax trees the terminal nodes of syntactic structures become very small—smaller than a morpheme. Starke 2009 is an introduction to nanosyntax, while Taraldsen 2010 illustrates nanosyntax at work and tests the approach against data from Nguni (Xhosa, Zulu, Ndebele, and Swati).

Kubrjakova, Elena S. 2000. Submorphemische einheiten (Übersetzung und bearbeitung: Joachim Mugdan). In *Morphology. An international handbook on inflection and word-formation*. Vol. 1. Edited by Geert Booij, Christian Lehmann, and Joachim Mugdan, 417–426. Berlin: Walter de Gruyter.

Many phenomena have been considered submorphemic in morphology. This article reviews the existing research on the topic.

Müller, Gereon. 2006. Subanalyse verbaler Flexionsmarker. In *Grammatische untersuchungen: Analysen und reflexionen: Gisela Zifonun zum 60. Geburtstag*. Edited by Eva Breindl, Lutz Gunkel, and Bruno Strecker, 183–203. Tübingen, Germany: Narr.

Subsegmentation of inflection: In the German present singular verb paradigm (e.g., *legen*, ‘to put’: 1sg *leg-e*, 2sg *leg-st*, and 3sg *leg-t*), there are three markers *-e* [+1], *-st* [+2], and *-t* [+3]. If *-st* is subsegmented, *-t* can be assigned the more general interpretation [−1] (*-e* [+1] and *-s* [+2]).

Starke, Michal. 2009. Nanosyntax: A short primer to a new approach to language. *Nordlyd* 36.1: 1–6.

An introduction to nanosyntax, a novel approach to the architecture of language that questions the very basic assumption that syntax operates only on lexical items such as morphemes and words.

Taraldsen, Tarald. 2010. The nanosyntax of Nguni noun class prefixes and concords. *Lingua* 120.6: 1522–1548.

A single morpheme (a Nguni noun class prefix or agreement marker) “spans” several syntactic terminals and thus can lexicalize a “span” of heads rather than a single head. See also Headedness.

Derivation versus Inflection

Some linguists assume that the affixes in the word form differ in nature and that a clear distinction between derivational and inflectional affixes should be made. This claim rests on a number of observations: Inflection follows derivation, inflectional affixes are relevant to syntax while derivational affixes are not, and so on; see the discussion in Anderson 1982. The claim that derivational and inflectional affixes should be treated separately is known as the split morphology hypothesis. Perlmutter 1988 is an illustration of this hypothesis. Beard 1995 defines an approach to morphology called lexeme-morpheme base morphology, which entails split morphology. Booij 1993 argues against split morphology because some types of inflection (e.g., plural) can feed word formation. Most of the theories mentioned in Theoretical Issues seem to make a principle distinction between derivational and inflectional affixes, though not all theories confess the fact explicitly. Some theories have been tested only, or primarily, against inflectional phenomena (e.g., realizational morphology [Stump 2001, cited under Mapping Meaning and Form, and Aronoff 1994]; distributed morphology [Halle and Marantz 1993, cited under Markedness]; nanosyntax [Starke 2009, cited under Subanalysis]). Other studies appear focused on derivation (e.g., Lieber 2005, cited under Mapping Meaning and Form). Still others define themselves only as theories of inflectional morphology (e.g., paradigm function morphology [Stump 2001, cited under Mapping Meaning and Form] and minimalist morphology [Wunderlich and Fabri 1995, cited under Mapping Meaning and Form]). A significant portion of the recent research in morphology is on inflection and is of two major types: (a) that which analyzes the (peculiar) ways inflectional affixes pattern with the help of the inflectional paradigm (Stump 2006) and (b) that which analyzes the same or similar phenomena without paradigms (Bobaljik 2002).

Anderson, Stephen R. 1982. Where’s morphology? *Linguistic Inquiry* 13:571–612.

Claims for separation of derivation and inflection, since inflection is relevant to syntax.

Aronoff, Mark. 1994. *Morphology by itself*. Cambridge, MA: MIT Press.

Postulates morphemes (stems of the type root + affix[es]), which are forms of purely morphological nature that cannot be derived by syntax, as they are not associated with particular semantic meaning.

Beard, Robert. 1995. *Lexeme-morpheme base morphology*. Albany: State Univ. of New York Press.

A theory of morphology that treats derivational and inflectional affixes differently.

Bobaljik, Jonathan. 2002. Syncretism without paradigms: Remarks on Williams 1981, 1994. In *Yearbook of morphology 2001*. Edited by Geert Booij and Jaap van Marle, 53–86. Dordrecht, The Netherlands: Springer Netherlands.

A distributed morphology account of syncretism.

Booij, Geert. 1993. Against split morphology. *Yearbook of morphology 1993*. Edited by Geert Booij and Jaap van Marle, 27–50. Dordrecht, The Netherlands: Kluwer Academic.

Distinguishes between inherent and contextual inflection, as only the affixes of the former can be followed by word-formation material, which the author sees as evidence against split morphology.

Perlmutter, David. 1988. The split morphology hypothesis: Evidence from Yiddish. In *Theoretical morphology: Approaches in modern linguistics*. Edited by Michael Hammond and Michael Noonan, 79–100. San Diego, CA: Academic.

A defense of the split morphology hypothesis.

Stump, Gregory. 2006. Heterocclisis and paradigm linkage. *Language* 82:279–322.

A paradigm-function-morphology account of heterocclisis.

Typology and Universals

Not all morphological language types make use of affixation to the same extent; for example, extensive affixation is typical of polysynthetic languages (Evans and Sasse 2002), but there are almost no affixes in the isolating language type. Descriptions of the major characteristics of the different morphological language types can be found in all general works on linguistic typology in the respective chapters on morphological typology (Croft 1990, Haspelmath, et al. 2001). The typological observations about the placement of affixes in the word form go along two dimensions: (a) closeness/distance to the root and (b) preceding/following the root. The most popular observations with respect to (a) come from Greenberg 1966 and Bybee 1985. Greenberg 1966 points out that derivational affixes appear closer to the root than inflectional affixes. Bybee 1985 provides an explanation of (a) in terms of semantic relevance (an affix that

is more relevant, affects more significantly the semantics of the root, and is placed closer to the root than an affix that is less relevant to the lexical semantics expressed by the root). With respect to (b), the number of exclusively prefixing languages is small in comparison to the number of exclusively suffixing languages (Mithun 2003). Carstairs-McCarthy 1994 and Spencer 2006 are articles on morphological typology written by famous morphology theorists. Types of Affixes are discussed in a separate section.

Bybee, J. 1985. *Morphology: A study of the relation between meaning and form*. Amsterdam: John Benjamins.

This book deals with questions of affix order in the verb from a typological perspective.

Carstairs-McCarthy, A. 1994. Typology, morphological. In *The encyclopedia of language and linguistics*. Vol. 9. Edited by R. E. Asher, 4817–4820. Oxford: Pergamon.

A short but very informative article on morphological typology.

Croft, William. 1990. *Typology and universals*. Cambridge, UK: Cambridge Univ. Press.

A famous book on typology and universals. Many of its sections are relevant to affixation.

Evans, N., and H.-J. Sasse, eds. 2002. *Problems of polysynthesis*. Berlin: Akademie Verlag.

Polysynthetic languages have very long words that contain many affixes. This volume is a typologically oriented collection of papers on polysynthesis.

Greenberg, Joseph H., ed. 1966. *Universals of language*. Cambridge, MA: MIT Press.

Formulates a set of forty-five universals, most of them of the form “If a language has A, then it will have (or is most likely to have) B.” A number of these universals relate to affixation, the most famous being Universal 28 (on the order of derivational and inflectional affixes) and Universal 39 (on the order of number and case affixes).

Haspelmath, Martin, Ekkehard König, Wulf Oesterreicher, and Wolfgang Raible. 2001. *Language typology and language universals: An international handbook*. Berlin: Walter de Gruyter.

Articles in English, German, and French written by leading typologists. For information pertinent to affixation, see Section VIII: Morphological Techniques.

Mithun, M. 2003. Why prefixes? *Acta Linguistica Hungarica* 50:155–185.

There is a general preference in the languages of the world for suffixes as opposed to prefixes. This article

explains the existence of prefixes in terms of language change.

Spencer, A. 2006. Morphological universals. In *On linguistic universals*. Edited by Ricardo Mairal and Juana Gil, 101–129. Cambridge, UK: Cambridge Univ. Press.

Discussion of morphological universals, with a focus on issues related to affixation.

Types of Affixes

Most types of affixes known today are defined in a very accessible way in Nida 1949's famous *Morphology* (cited under General Overviews). Suffixes, prefixes, and circumfixes (Hall 2000) are the most common and most widely accepted types of affixes. Suffixes, prefixes, and circumfixes occur in derivation and inflection, and every textbook-like introduction to morphology defines them; see the books cited under General Overviews. Circumfixation is sometimes also called parasynthesis (Iacobini 2010). More controversial are transfixes (Broselow 2000), infixes (Moravcsik 2000), interfixes (Bauer 2003, cited under Intermediate-Level Textbooks), and zero suffixes (Marchand 1974, cited under Item-and-Arrangement versus Item-and-Process). Aronoff and Fuhrhop 2002 defines closing suffixes.

Aronoff, Mark, and Nanna Fuhrhop. 2002. Restricting suffix combinations in German and English: Closing suffixes and the monosuffix constraint. *Natural Language and Linguistic Theory* 20:451–490.

Discussion of closing suffixes in German. Interfixes (linking elements in the literature written in German) “reopen” stems closed by closing suffixes and thus make possible the attachment of further morphological material, as in compounds. According to Bauer 2003 (cited under Intermediate-Level Textbooks), linking elements are formal elements that do not represent morphemes (affixes) but empty morphs.

Broselow, Ellen. 2000. Transfixation. In *Morphology. An international handbook on inflection and word-formation*. Vol. 1. Edited by Geert Booij, Christian Lehmann, and Joachim Mugdan, 551–556. Berlin: Walter de Gruyter.

A transfix is a discontinuous affix that inserts within the base, as is typical for Semitic morphology; for example, *ktb* ‘write’ → *katab* ‘he wrote’. The article discusses in detail the various aspects of this somewhat controversial type of affixation.

Hall, Christoph J. 2000. Prefixation, suffixation and circumfixation. In *Morphology. An international handbook on inflection and word-formation*. Vol. 1. Edited by Geert Booij, Christian Lehmann, and Joachim Mugdan, 535–544. Berlin: Walter de Gruyter.

An overview article that defines the three major types of affixes.

Iacobini, C. 2010. Les verbes parasynthétiques: de l'expression de l'espace à l'expression de l'action. *De Lingua Latina* 3.

This article is a useful discussion of parasynthesis with a focus on parasynthetic verbs in Romance languages.

Moravcsik, Edith. 2000. Infixation. In *Morphology. An international handbook on inflection and word-formation*. Vol. 1. Edited by Geert Booij, Christian Lehmann, and Joachim Mugdan, 545–551. Berlin: Walter de Gruyter.

Defines and discusses a controversial type of affixation. An infix is positioned inside the base, as in *sing–sang* in English.

Yu, Alan C. L. 2007. *A natural history of infixation*. Oxford: Oxford Univ. Press.

A thorough investigation of infixation. Explores its prosodic, phonological, and morphological characteristics as well as its different functions and origins. Draws on 154 infixation patterns from over 100 languages.

Multiple Affixation

This section deals with complex words that have more than one affix. Crucially, when more than one affix occurs in a word, there are severe restrictions on the order of those affixes, and many combinations that are semantically conceivable and phonologically possible do not exist, which has prompted linguists look for the factors behind affix ordering. There is much research on affix ordering, especially in lesser-studied languages of the polysynthetic type (see Typology and Universals), which are characterized by words containing long sequences of affixes. Of the well-described languages, most research focuses on English. Collections of papers on multiple affixation in typologically diverse lesser-studied and well-studied languages have been published as special issues of the journals *Morphology* and *Word Structure*; both cited under Journals and Special Issues.

Principles of Affix Ordering

Overview articles on affix ordering are rare. Nevertheless, Muysken 1986, Manova and Aronoff 2010, and Rice 2011 review the existing research and define affix-order principles. Muysken 1986 is a critical assessment of the literature on affix ordering, mostly in the generative paradigm and with emphasis on template morphology (see Templates and Position Classes); the discussion draws on data from Quechua. Manova and Aronoff 2010 is an attempt to model affix ordering in terms of type of information; the goal is to generalize as much as possible and formulate principles relevant to typologically diverse lesser-studied and well-studied languages. Rice 2011 is on affix ordering that does not change word class, as it is typical of lesser-studied, primarily polysynthetic, languages.

Manova, S., and M. Aronoff. 2010. Modeling affix order. *Morphology* 20.1: 109–131.

Based on the type of information that might be involved in affix ordering, a set of ordering principles is predicted; for example, affix ordering that depends on phonological information is phonological, affix ordering that relies on semantic information is semantic, and so on. All affix-order principles are illustrated with research from the literature.

Muysken, Peter. 1986. Approaches to affix order. *Linguistics* 24:629–643.

A review of the approaches to affix order within the generative paradigm. Very informative paper, especially for linguists interested in Syntactic and Semantic Ordering. Criticism of the template-morphology analysis based on Quechua data.

Rice, Keren. 2011. Principles of affix ordering: An overview. *Word Structure* 4.2: 169–200.

Analyzes word-class preserving affix ordering, primarily in verbs in lesser-studied languages, and explains it in terms of phonological, morphological, semantic, and syntactic factors. A very informative and well-organized paper.

Syntactic and Semantic Ordering

Most of the research on affix ordering in understudied languages explores the mirror principle (Baker 1985) and thus provides a syntactic explanation of the order of affixes. The mirror principle argues that morphological derivations directly reflect syntactic derivations and vice versa. Some researchers who explain affix ordering semantically also assume that semantic derivation directly maps syntactic derivation as both syntax and semantics mean compositionality (Rice 2000). Manova and Aronoff 2010, cited under Principles of Affix Ordering, makes a clear distinction between syntactic and semantic affix ordering, as the former relies on syntactic information, such as subject and object, whereas the latter depends on information that involves semantic categories, such as 'human', 'material', and so on. Paster 2005 speaks of semantic ordering if the order of affixes cannot be explained in terms of argument structure. Rice 2011, cited under Principles of Affix Ordering, revisits Rice 2000 on the mirror-like mapping of syntax and semantics. Semantic ordering by itself does not refer to syntax but looks for scopal relations between affixes, since if affix X scopes semantically over affix Y, X is outside Y in the word form. Scopal semantic ordering relies on cognitive principles (Muysken 1986, cited under Principles of Affix Ordering). Scopal ordering is nicely illustrated for a whole language family (Athapaskan) in Rice 2000. Paster 2005 is a revision of Rice 2000's claim on the relation between template (see Templates and Position Classes) and scopal ordering. Rice 2000 ranks scope over template, maintaining that template ordering applies when scope is not operative. Explanations of affix ordering in well-studied languages in terms of syntax and/or semantics are fairly rare, though see Svenonius 2004 on the ordering of the Slavic verbal prefixes.

Baker, Mark. 1985. The mirror principle and morphosyntactic explanation. *Linguistic Inquiry*

16:373–415.

A very influential paper that formulates the mirror principle: “Morphological derivations must directly reflect syntactic derivation (and vice versa)” (p. 375).

Paster, M. 2005. Pulaar verbal extensions and phonologically driven affix order. In *Yearbook of morphology 2005*. Edited by G. Booij and J. van Marle, 155–199. Dordrecht, The Netherlands: Springer.

This paper revisits the traditional phonological analysis of affix ordering in Pulaar languages and suggests an alternative account in terms of semantic scope.

Rice, Keren. 2000. *Morpheme order and semantic scope*. Cambridge, UK: Cambridge Univ. Press.

Provides an analysis in terms of semantic scope, templates, and phonology, though often misleadingly cited as being an exclusively semantic account. Affixes that, for some reason, are not in a scopal relationship are ordered by phonology and templates.

Svenonius, Peter, ed. 2004. *Special Issue: Slavic Prefixes*. *Nordlyd* 32.2.

A set of papers that explain the order of the Slavic verbal prefixes in terms of argument structure alternations and scopal relations.

Phonological Ordering

Manova and Aronoff 2010, cited under Principles of Affix Ordering, defines phonological ordering as depending on phonological information. An example of a phonological-affix-ordering rule would be “If the base terminates in a vowel, attach the suffix X to it.” Purely phonologically ordered affixal systems are rare. Nevertheless, Hyman 2006; Bickel, et al. 2007; and Kim 2010 are usually seen as studies providing evidence for phonological affix ordering. Hyman 2006 discusses data from a Bantu language (spoken in Congo); Bickel, et al. 2007 is on a Kiranti language (spoken in Nepal), while the data in Kim 2010 come from the language isolate Huave (spoken in San Francisco del Mar). Paster 2009 argues against phonological ordering and reanalyzes some of the examples of phonologically driven affixation in the literature.

Bickel, B., G. Banjade, M. Gaenszle, et al. 2007. Free prefix ordering in Chintang. *Language* 83.1: 1–31.

“Free” in the title is misleading, since the article provides a phonological explanation of the variable prefix order in Chintang; namely the authors see prefix permutations as a side effect of prosodic subcategorization.

Hyman, Larry. 2006. Affixation by place of articulation: Rare and mysterious. *UC Berkeley Phonology Lab Annual Report 2006*:24–51.

A rare example of purely phonological affix ordering with data from Tiene. Most roots in Tiene consist of $C_1V(V)C_2$ (VV = long vowel), and the way causative is formed depends on the place of articulation of C_2 .

Kim, Yuni. 2010. Phonological and morphological conditions on affix order in Huave. *Morphology* 20.1: 133–163.

Adopts a “P >> M” strategy within optimality theory where phonological (P) and morphological (M) constraints are evaluated in parallel. The Huave affixes are suffixes by default. Depending on the termination of the base to which they attach, that is if the base is consonant-final, some of the suffixes end up as prefixes in order to avoid epenthesis.

Paster, Mary. 2009. Explaining phonological conditions on affixation: Evidence from suppletive allomorphy and affix ordering. *Word Structure* 2.1: 18–37.

Makes an argument against phonological affix ordering, that is, against the ranking of phonology over morphology (see Kim 2010) and claims for a phonology–morphology interface in which morphology precedes phonology at each level of the grammar in a cyclic-type approach.

Morphological Ordering

According to Manova and Aronoff 2010 (cited under Principles of Affix Ordering), morphological ordering relies on morphological information, and its rules are of the type “if affix X, then affix Y.” Two of the approaches explaining the order of English affixes illustrate morphological ordering. The first approach assigns affixes to different strata and is termed Stratal Ordering, while the second approach relies on Selectional Restrictions.

Stratal Ordering

This approach distributes the English affixes into two classes—Class I and Class II affixes (classes are also called levels or strata)—and assumes specific interactions between the two classes. Siegel 1974 uses phonology to differentiate between the two types of strata. The levels in Selkirk 1982 are defined in terms of word structure such as roots and words. Kiparsky 1982 employs levels in terms of cyclic application of phonological rules and possible ordering of morphological processes. Thus in the different studies we find the following claims: Class I affixes tend to be phonologically less transparent than Class II affixes; that is, Class I affixes cause stress shifts, resyllabification, and other morphophonological alternations, whereas Class II affixes do not; Class I affixes frequently attach to bound roots; Class I affixes are less productive and less semantically transparent than Class II affixes; and Class I affixes do not occur outside Class II affixes. The last claim is a prototypical instance of morphological ordering.

Kiparsky, P. 1982. Lexical morphology and phonology. In *Linguistics in the morning calm: Selected papers from SICOL-1981*. Edited by Linguistic Society of Korea, 3–91. Seoul: Hanshin.

The foundational work on lexical morphology, a level-ordered model of morphology.

Selkirk, E. 1982. *The syntax of words*. Cambridge, MA: MIT Press.

The approach taken is a syntactic one and differentiates between root affixes (attach to roots) and word affixes (attach to words) such that root affixes are internal with respect to word affixes.

Siegel, D. 1974. *Topics in English morphology*. Cambridge, MA: MIT Press.

The first treatment of English affixes in terms of strata: +affixes (blur the morpheme boundary) are internal to #affixes (leave the morpheme boundary intact).

Selectional Restrictions

Of all possible combinations of English suffixes allowed by level ordering, only a few exist. This fact made Fabb 1988 claim that it is not the relation of a suffix with a particular stratum but selectional restrictions of individual suffixes that are responsible for the combinatorial properties of suffixes. Plag 1996 established numerous counterexamples to Fabb's affix-driven model and put forward an alternative proposal that is base-driven and relies on phonological, morphological, semantic, and syntactic suffix-particular properties.

Fabb, N. 1988. English suffixation is constrained only by selectional restrictions. *Natural Language and Linguistic Theory* 6:527–539.

Rejects the stratal approach and proposes affix-driven ordering based on selectional restrictions.

Postulates the following groups of suffixes: Group 1: suffixes that do not attach to already suffixed words; Group 2: suffixes that attach outside one other suffix; Group 3: suffixes that attach freely; and Group 4: problematic suffixes.

Plag, I. 1996. Selectional restrictions in English suffixation revisited. A reply to Fabb (1988). *Linguistics* 34.4: 769–798.

Critical review of Fabb 1988's proposal. Claims for base-driven affix ordering and that the sectional restrictions (phonological, morphological, semantic, and syntactic properties) are responsible for the possible and impossible combinations of an affix.

Templates and Position Classes

For instances of affix ordering where no grammatical principles apply, linguists assume template ordering: Affixes are arbitrarily assigned to slots and ordered in such a way that affixes occupying the same slot never co-occur. There are many overviews of the properties of template morphology in the literature (see e.g., Stump 2006) but Simpson and Withgott 1986 is usually pointed out as the first definition of templates. Inkelas 1993 explains the Nimboran affix ordering in terms of position classes. In different studies, template and position class are used as synonymous terms most of the time, though according to Inkelas 1993 they differ as the definition of “position” involves two dimensions (vertical hierarchical order and linear template order) while templates are one-dimensional (linear ordering only). There is some debate in the literature about whether template ordering exists and has any theoretical implications (Muysken 1986, cited under Principles of Affix Ordering). Rice 2011 (cited under Principles of Affix Ordering) sees templates as Morphological Ordering. Likewise, Hyman 2003 argues that Bantu affix ordering is largely templatic and that this is evidence for the autonomy of morphology. Good 2011 is a typologically oriented review of the research on templates in grammar (i.e., the author speaks of templates not only in morphology).

Good, Jeff. 2011. The typology of templates. *Language and Linguistic Compass* 5:731–747.

An attempt in defense of templates. The part on templates in morphosyntax is the one relevant to affix ordering.

Hyman, L. 2003. Suffix ordering in Bantu: A morphocentric approach. *Yearbook of morphology* 2002. Edited by G. E. Booij and Jaap van Marle, 245–281. Dordrecht, The Netherlands: Kluwer Academic.

Claims that suffix ordering in Bantu is templatic by default and that there is no evidence that the ordering of Bantu suffixes is driven by semantic compositionality or the mirror principle.

Inkelas, Sharon. 1993. Nimboran position class morphology. *Natural Language & Linguistic Theory* 11:559–624.

Postulates position classes that differ from templates as each “position” is a distinct level in a morphological constituent hierarchy, whereas templates are flat; that is, position classes are a sort of complex templates but not all templates involve position classes. A difficult text, often misleadingly cited as an illustration of template morphology.

Simpson, Jane, and Margaret Withgott. 1986. Pronominal clitic clusters and templates. In *The syntax of pronominal clitics*. Vol. 19 of *syntax and semantics*. Edited by H. Borer, 149–174. New York: Academic.

This article is considered the first definition of template morphology in the literature.

Stump, Gregory. 2006. Template morphology. In *Encyclopedia of language and linguistics*. 2d ed. Vol. 12. Edited by Keith Brown, 559–562. Oxford: Elsevier.

An accessible overview of research on template morphology.

Parsability Hypothesis and Complexity-Based Ordering

According to Hay 2002 and Hay 2003, affixes order in such a way that more parsable affixes do not occur within less parsable affixes, since the attachment of a less separable affix to a more separable one is difficult to process. This claim is known as the parsability hypothesis. Parsability depends on different factors such as phonotactics, Productivity, semantic transparency, and relative frequency and occurs by gradations, which allows affixes to be ordered hierarchically according to their ability to parse. Plag 2002 demonstrates that suffix-particular properties that are Selectional Restrictions can override parsability and suggests the label complexity-based ordering (CBO); that is, the complexity of word structure increases outwardly—with the addition of an affix. Consequently, Hay and Plag 2004 orders English suffixes in a hierarchy of juncture strength that depends on both parsability and selectional restrictions. The hierarchy restricts affix ordering in the following way: If the affixes A, B, C, D, and E form a hierarchy, affixes that follow—say C on the hierarchy—can be added to words already affixed by C, whereas affixes preceding C on the hierarchy cannot be attached to words containing C (i.e., *CAD should be an impossible combination whereas ACD should be a well-formed combination). Plag and Baayen 2009 is the latest revision of CBO with English data. Manova 2010 applies CBO to Slavic data and shows that the model cannot account for the order of the Bulgarian suffixes, especially in derivation.

Hay, J. 2002. From speech perception to morphology: Affix-ordering revisited. *Language* 78.3: 527–555.

Changes the focus of the research on affix ordering from structural to psycholinguistic factors.

Hay, J. 2003. *Causes and consequences of word structure*. New York: Routledge.

This book defines the parsability hypothesis.

Hay, J., and I. Plag. 2004. What constrains possible suffix combinations? On the interaction of grammatical and processing restrictions in derivational morphology. *Natural Language & Linguistic Theory* 22:565–596.

This paper argues for complexity-based ordering whereby parsability works in conjunction with selectional restrictions.

Manova, S. 2010. Suffix combinations in Bulgarian: Parsability and hierarchy-based ordering.

Morphology 20.1: 267–296.

Complexity-based ordering cannot account for the order of the Bulgarian derivational suffixes, which exhibit a number of peculiarities in comparison to the English derivational suffixes. The Bulgarian derivational suffixes often participate in permutations (see Variable Ordering) and can be repeated.

Plag, I. 2002. The role of selectional restrictions, phonotactics and parsing in constraining suffix ordering in English. In *Yearbook of morphology 2001*. Edited by G. Booij and J. van Marle, 285–314. Dordrecht, The Netherlands: Kluwer.

Reviews the various approaches to affix order in English, including the parsability hypothesis, and shows that suffix-particular restrictions (Selectional Restrictions) should also be considered. Suggests the label complexity-based ordering (CBO), as morphological complexity increases from the innermost to the outermost morphological layer.

Plag, I., and H. Baayen. 2009. Suffix ordering and morphological processing. *Language* 85.1: 109–152.

With behavioral data from lexical decision and word naming, it is argued that CBO has been one-sided and that the role of memory should be considered as well. The space of existing suffix combinations is conceptualized as a directed graph, which is acyclic, with very few exceptions. Thus acyclicity is hypothesized to be functional for lexical processing.

Variable Ordering

Variable affix ordering, that is, AB–BA order of affixes, is also referred to as affix permutation. The research on variable affix ordering is still sparse, and it is unclear how affix permutations relate to affix ordering that relies on grammatical factors, including scopal relations, though see the discussions on variable ordering in understudied languages in Ryan 2010 and Rice 2011 (cited under Principles of Affix Ordering). Variable affix ordering has been reported in well-studied languages and lesser-studied languages alike. Manova 2010 points out cases of AB–BA ordering of derivational suffixes in the Slavic language Bulgarian. Zirkel 2010 provides examples of variable ordering of the English prefixes. On variable affix ordering in understudied languages see Bickel, et al 2007 (data from Chintang); Caballero 2010 (data from Raramuri); and Ryan 2010 (data from Tagalog). On the basis of the examples of affix permutations reported in the literature, it seems that variable affix order is more frequent in prefixation than in suffixation.

Bickel, B., G. Banjade, M. Gaenszle, et al. 2007. Free prefix ordering in Chintang. *Language* 83.1: 1–31.

Variable affix ordering is mistakenly called “free.” The authors provide an explanation of the variability of the order of affixes in terms of Phonological Ordering.

Caballero, Gabriela. 2010. Scope, phonology and morphology in an agglutinating language: Choguita Rarámuri (Tarahumara) variable suffix ordering. *Morphology* 20.1: 165–204.

Gives a number of examples and provides an analysis of the patterns involved in variable ordering in the understudied Mexican language Choguita Rarámuri.

Manova, S. 2010. Suffix combinations in Bulgarian: Parsability and hierarchy-based ordering. *Morphology* 20.1: 267–296.

Discusses the variable ordering of a number of Bulgarian derivational suffixes. Intriguingly, Bulgarian inflectional morphology does not allow permutation of suffixes.

Ryan, Kevin. 2010. Variable affix order: Grammar and learning. *Language* 86.4: 758–791.

Review of the existing research on variable affix order in lesser-studied languages. Analyzes the variable ordering of a Tagalog affix and develops a theory of morpheme ordering based on local morphotactic restrictions encoded as weighted bigram (two-suffix combinations) constraints.

Zirkel, Linda. 2010. Prefix combinations in English: Structural and processing factors. *Morphology* 20.1: 239–266.

Gives examples of variable affix ordering of English prefixes. Variable ordering is less typical of English suffixes; see examples in Plag and Baayen 2009 (cited under Parsability Hypothesis and Complexity-Based Ordering)

Productivity

Productivity refers to the ability of an affix to form new words and is thus particularly pertinent to affixation. Productive affixes have a number of characteristics that differentiate them from unproductive affixes; for example, productive affixes are more transparent semantically than less productive ones; they are also more easily parsable and tend to have more peripheral position in the word form, and so on. A great deal of the existing research on productivity is related to the name of Harald Baayen, who has studied the quantitative aspects of productivity for years and suggested different measures of productivity (Baayen 2001). Baayen maintains a website that gives much information about his past and present research and can be very helpful to all interested in productivity, statistical matters, and formal presentation of results related to productivity of affixes. Other well-known studies on morphological productivity include Bauer 2001 (a book-length study of the different aspects of morphological productivity), Rainer 2005 (which discusses constraints on productivity), Aronoff and Gaeta 2003 (a collection of papers on specific issues related to productivity in derivation and inflection), and Dressler 2003 (which proposes a qualitative approach to productivity, with a focus on inflectional morphology).

Aronoff, Mark, and Livio Gaeta, eds. 2003. *Special Section: Morphological Productivity. Italian Journal of Linguistics* 15.1.

A set of papers on morphological productivity written by well-known specialists.

Baayen, R. Harald. 2001. *Word-frequency distributions*. Dordrecht, The Netherlands: Kluwer.

Discusses the predictiveness of productivity measures that rely on frequency distributions.

Bauer, Laurie. 2001. *Morphological productivity*. Cambridge, UK: Cambridge Univ. Press.

Critical assessment of research on morphological productivity by a leading morphologist.

Dressler, Wolfgang U. 2003. Degrees of grammatical productivity in inflectional morphology. *Italian Journal of Linguistics* 15.1: 31–62.

Puts forward a qualitative approach to productivity in inflection that relies on functional and semiotic observations such as attachment of an affix to borrowings, output of conversion rules, and so on.

Official Website of R. Harald Baayen.

A well-organized and frequently updated website that presents and explains Harald Baayen's research on productivity and related issues.

Rainer, Franz. 2005. Constraints on morphological productivity. In *Handbook of word-formation*. Edited by Pavol Štekauer and Rochelle Lieber, 335–352. Dordrecht, The Netherlands: Springer.

Provides a typology of constraints on productivity in natural languages.

Origins of Affixation

The explanation of the origins of affixation is part of the debate on the evolution of morphology (Carstairs-McCarthy 2010), which relates affixation to either Phonology or Syntax and Grammaticalization. However, according to the literature on affixation, Borrowing of bound morphology can also feed affixation.

Carstairs-McCarthy, Andrew. 2010. *The evolution of morphology*. Oxford: Oxford Univ. Press.

This book considers the evolution of the grammatical structure of words in the more general contexts of human evolution and the origins of language. It challenges the conventional view of the relationship

between syntax and morphology, that is, the claim that all morphology is grammaticalized syntax. See *Syntax and Grammaticalization*.

Phonology

Although the conventional view (see, e.g., Comrie 1992) relates the emergence of affixation to Syntax and Grammaticalization, it is hard to imagine that all types of affixes are grammaticalized lexical items. At least the origin of suprafixes (as in *import–impórt*), infixes (as in *sing–sang*) and transfixes (as in *ktb* ‘write’ → *katab* ‘he wrote’) should have something to do with phonology. The existence of such affixes made some linguists claim independence of morphology from syntax in the course of language evolution. The latter claim can be found in Carstairs-McCarthy 2005 and Carstairs-McCarthy 2010. Outside the debate on the evolution of morphology, Yu 2007 (cited under Types of Affixes) considers metathesis one of the diachronic sources of infixation.

Carstairs-McCarthy, Andrew. 2005. *The evolutionary origin of morphology*. In *Language origins: Perspectives on evolution*. Edited by M. Tallerman, 166–184. Oxford: Oxford Univ. Press.

Argues that morphology is quite independent from syntax, since regular alternations in the shape of morphs may have originated for phonological reasons.

Carstairs-McCarthy, Andrew. 2010. *The evolution of morphology*. Oxford: Oxford Univ. Press.

This book discusses affixation in the more general contexts of human evolution and the origins of language.

Comrie, Bernard. 1992. *Before complexity*. In *The evolution of human languages*. Edited by J. A. Hawkins and M. Gell-Mann, 193–211. Reading, MA: Addison-Wesley.

Affixes originated as items whose behavior was to be accounted for syntactically.

Syntax and Grammaticalization

Heine and Kuteva 2007 claims that bound morphology such as affixes frequently arises from independent words (lexical morphology). This type of diachronic morphological change is known as grammaticalization and is discussed extensively in Hopper and Traugott 2003 and Narog and Heine 2011. Grammaticalization is a continuous change, and linguistic forms such as particles and clitics that are at the morphology–syntax interface are only partly grammaticalized and exhibit characteristics of both lexical and bound morphology. Los, et al. 2012 is on particle verbs in Germanic languages. Although the Germanic family is considered the typical ground of particle verbs, Iacobini and Masini 2007 provides evidence for the existence of particle verbs in Italian as well. Spencer and Luís 2012 is a profound study of the various aspects of cliticization in a number of languages. Yu 2007 sees grammaticalization in terms of entrapment

as one of the origins of infixation.

Heine, B., and T. Kuteva. 2007. *The genesis of grammar*. Oxford: Oxford Univ. Press.

This book argues that grammar arises through the process of grammaticalization of affixal morphology from full lexical items.

Hopper, P., and E. Traugott. 2003. *Grammaticalization*. Cambridge, UK: Cambridge Univ. Press.

One of the best-known books on grammaticalization. From-words-to-affixes and from-affixes-to-words scenarios in a language.

Iacobini, Claudio, and Francesca Masini. 2007. The emergence of verb–particle constructions in Italian: Locative and actional meanings. *Morphology* 16.2: 155–188.

The authors make an argument for verb–particle constructions in Italian.

Los, Bettelou, Corrien Blom, Geert Booij, Marion Elenbaas, and Ans van Kemenade. 2012. *Morphosyntactic change: A comparative study of particles and prefixes*. Cambridge, UK: Cambridge Univ. Press.

A comparative and historical study on particle verbs. Such verbs are termed “separable complex verbs” in the literature on German and Dutch and “verb particle combinations” in the literature on English. The analysis postulates a new morphosyntactic category—that of the optionally projecting word (i.e., a particle).

Narog, Heiko, and Bernd Heine, eds. 2011. *The Oxford handbook on grammaticalization*. Oxford: Oxford Univ. Press.

A number of articles in this very comprehensive handbook are relevant to affixation.

Spencer, Andrew, and Anna R. Luís. 2012. *Clitics: An introduction*. Cambridge, UK: Cambridge Univ. Press.

Chapter 5, titled “Clitics and Morphology,” puts forward a set of criteria for differentiation of affixes and clitics.

Yu, Alan C. L. 2007. *A natural history of infixation*. Oxford: Oxford Univ. Press.

Among other things, this book explores the range of diachronic pathways that leads to different kinds of infix. One of those pathways, namely entrapment, involves grammaticalization (see chapter 5).

Borrowing

It is well known that languages in a contact situation (Aikhenvald and Dixon 2007) may borrow free (lexemes) and bound (affixes) morphology. The exact mechanism governing the selection of borrowed material in language contact is still unclear, but according to what has been reported in the literature, the borrowability of an affix seems to depend on a complex range of factors, including the morphological types of the languages in contact (Bakker and Hekking 2012). Traditionally, borrowability scales are assumed (Seifart 2012): Derivational affixes are more likely to be borrowed than inflectional affixes; within inflection, the affixes of inherent inflection are more likely to be borrowed than those of contextual inflection (see Derivation versus Inflection); and noun and adjective affixes are more frequently borrowed than verbal affixes. Seifart 2012 criticizes the use of such hierarchies, since they imply random collection of borrowed material. Thomason and Kaufman 1988 refers to this and related problems as “picking out of the mass of data only those data that support the model” (p. 331) and also shows that in a contact situation many factors count. According to Seifart 2012, a contact situation usually results in borrowing of a number of morphological markers that are grammatically related. Some linguists report heavy constraints on what can be borrowed (Bakker and Hekking 2012), whereas, according to others, it seems that everything can be borrowed, including contextual inflection (Meakins 2011).

Aikhenvald, Alexandra, and R. M. W. Dixon, eds. 2007. *Grammars in contact. A cross-linguistic typology*. Oxford: Oxford Univ. Press.

A popular book on contact linguistics, cited in virtually all work on grammatical borrowing.

Bakker, Dik, and Ewald Hekking. 2012. Constraints on morphological borrowing: Evidence from Latin America. In *Copies versus cognates in bound morphology*. Edited by Lars Johanson and Martine Robbeets, 187–220. Leiden, The Netherlands: Brill.

Discussion of the borrowing of morphology from Spanish by three unrelated and typologically different American-Indian languages: Quechua, Guarani, and Otomi. The authors argue for strong constraints on the transfer of bound morphemes in a contact situation. Borrowed affixes enter a language as parts of borrowed lexical items that are complex words; afterward, those affixes may be eventually attached to native lexemes.

Johanson, Lars, and Martine Robbeets, eds. 2012. *Copies versus cognates in bound morphology*. Leiden, The Netherlands: Brill.

This book discusses the origin of bound (affixal) morphology. Two hypotheses are advanced: Cognates

are affixes that arise due to influence from genealogically related languages, while borrowed affixes are copies and come from genealogically unrelated languages.

Meakins, Felicity. 2011. Borrowing contextual inflection: Evidence from northern Australia. *Morphology* 21.1: 57–87.

This paper discusses the borrowability of contextual inflection, since it has been argued in the literature that this type of inflection is hard to borrow. It is shown that in a situation of intensive language contact, all types of morphology can be borrowed.

Seifart, Frank. 2012. The principle of morphosyntactic subsystem integrity in language contact: Evidence from morphological borrowing in Resígaro (Arawakan). *Diachronica* 29.4: 471–504.

Proposes the principle of morphosyntactic subsystem integrity: When various grammatical morphemes are borrowed, they tend to be morphosyntactically interrelated.

Thomason, Sarah G., and Terrence Kaufman. 1988. *Language Contact, creolization, and genetic linguistics*. Berkeley: Univ. of California Press.

A thorough discussion of the various aspects of borrowing based on surveys of well-documented cases.

Psycholinguistics

Affixes, whether having only form or both form and semantics (Mapping Meaning and Form), should be stored in some way in the mind and accessed during comprehension, processing, and production. All of these fall in the scope of psycholinguistics. As introductory readings on the role of psycholinguistics in morphology can serve the respective chapters on morphology in the mind in Bauer 2003 and Booij 2012 (both cited under Intermediate-Level Textbooks). The references listed in this section are meant to provide more detailed information and are organized in two subsections: The first, Comprehension and Processing, is on the organization of the mental lexicon, more precisely on how affixes are represented there; the second, Child Language, is on the acquisition of derivational and inflectional affixes. Of the other issues discussed in this article, Parsability Hypothesis and Complexity-Based Ordering as well as Variable Ordering are particularly relevant to psycholinguistics.

Comprehension and Processing

Questions of comprehension and processing of bound morphology have been the subject of extensive research for the past thirty years. Baayen and Schreuder 2003 and Marslen-Wilson 2007 reveal more about the theoretical-morphology perspective of that research, whereas the other two papers cited in this section provide the cognitive-neuroscience perspective. Diependale, et al. 2012 is a review of experimental research on processing of derivational morphology. Woollams and Patterson 2012 reviews

neuroscience research on the single–dual-route debate (in a dual-route model regular and irregular morphology are dealt with in different ways—irregular morphology is stored, and the regular forms are produced in real time).

Baayen, Harald R., and Robert Schreuder, eds. 2003. *Morphological structure in language processing*. Berlin: Mouton de Gruyter.

A set of papers dealing with various aspects of morphological processing and written by well-known specialists.

Diependale, Kevin, Jonathan Grainger, and Dominiek Sandra. 2012. Derivational morphology and skilled reading: An empirical overview. In *The Cambridge handbook of psycholinguistics*. Edited by Michael J. Spivej, Ken McRae, and Marc F. Joanisse, 311–332. Cambridge, UK: Cambridge Univ. Press.

The paper reviews experimental research on morphological processing carried out in the past thirty years or so. Overview of the main theoretical questions and empirical results with a focus on derivational morphology.

Marslen-Wilson, William D. 2007. Morphological processes in language comprehension. In *The Oxford handbook of psycholinguistics*. Edited by M. Gareth Gaskell, 175–193. Oxford: Oxford Univ. Press.

Review of the existing research on how bound morphemes, inflectional and derivational, are processed during language comprehension.

Woollams, Anna, and Karalyn Patterson. 2012. The neural basis of morphology: A tale of two mechanisms? In *The Cambridge handbook of psycholinguistics*. Edited by Michael J. Spivej, Ken McRae, and Marc F. Joanisse, 333–350. Cambridge, UK: Cambridge Univ. Press.

This paper assesses cognitive neuroscience research on the single- and dual-route mechanisms in morphological processing. It discusses the representation of both inflection and derivation in the brain, but more attention is paid to inflection, the subfield that became the starting point for the single–dual-route debate.

Child Language

The research on the acquisition of affixation is primarily on inflectional morphology. Dressler 2012 is a state-of-the-art collection of papers on the acquisition of inflection. The acquisition of derivational morphology starts much later, and only a very few studies provide evidence for how derivational affixes are mastered in first-language development. Clark 1993 is the most famous investigation of the acquisition

of derivational morphology. However, in languages with productive diminutivization, diminutive suffixes are acquired as early as the inflectional suffixes. Diminutivizers seem to facilitate the acquisition of inflectional morphology, as it is shown in Savickiene and Dressler 2007.

Clark, Eve. 1993. *The lexicon in acquisition*. Cambridge, UK: Cambridge Univ. Press.

This book nicely illustrates the emergence of the English derivational suffixes in first-language acquisition. In the different chapters, data from Icelandic, Hebrew, German, Romance, and Slavic languages are also discussed.

Dressler, Wolfgang U., ed. 2012. *Special Issue: Acquisition of Inflectional Morphology*. *Morphology* 22.1.

State-of-the-art research on the acquisition of inflection from a cross-linguistic perspective. Articles by leading specialists in the field of child language.

Savickiene, Ineta, and Wolfgang U. Dressler, eds. 2007. *The acquisition of diminutives: A cross-linguistic perspective*. Amsterdam: Benjamins.

On the acquisition of diminutive affixes in a number of languages with productive diminutivization. Diminutive affixes are the first word-formation affixes to emerge. The early acquisition of diminutive affixes is argued to facilitate the acquisition of inflectional affixes as diminutives are semantically transparent and related with (a) particular inflectional class(es).

Computational Modeling

With the development of corpus linguistics, the focus of computational linguistics has somehow shifted to syntax, semantics, and pragmatics, and there has not been much research on morphology recently. Trost 2005 is an overview of the existing research on computational morphology, whereas Beesley and Karttunen 2003 and Evans and Gazdar 1996 represent important steps in the development of the field. Mahlov and Piotrowski 2009 is a set of state-of-the-art articles.

Beesley, K. R., and L. Karttunen. 2003. *Finite-state morphology*. Stanford, CA: CSLI.

This book introduces finite-state morphology. The model is used in most computational accounts of morphology and is particularly successful in handling concatenative (i.e., affixal) morphology.

Evans, N., and G. Gazdar. 1996. *DATR: A language for lexical knowledge representation*. *Computational Linguistics* 22:167–216.

The introduced computer language DATR relies on defaults and seems very suitable for computational implementations of morphology (affixation).

Mahlov, Cerstin, and Michael Piotrowski, eds. 2009. *State of the art in computational morphology*. Berlin: Springer.

State-of-the-art research on computational morphology (affixation), with a focus on systems for a specific language (German).

Trost, Harald. 2005. Morphology. In *The Oxford handbook of computational linguistics*. Edited by Ruslan Mitkov, 25–47. Oxford: Oxford Univ. Press.

An accessible account of computational morphology. There is an explicit discussion on issues related to the computational modeling of affixation. Provides an overview of existing approaches and compares finite-state automata with alternative formalisms such as that described in Evans and Gazdar 1996.

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