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Subtractive Morphology

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Introduction

Subtraction consists in a shortening of a morphological base as in the Russian derivation *mikrobiologija* ‘microbiology’ → *mikrobiolog* ‘microbiologist’. Of course, one can doubt the correctness of the direction of this derivation and claim that the shorter form *mikrobiolog* serves as a base for *mikrobiologija* and not vice versa. However, from the literature on word-formation it is well known that the most important diagnostic criterion for being a product of a derivation is semantic dependence; i.e., the definition of the derivative depends on the meaning of its base. In our case, the definition of *mikrobiolog* depends on *mikrobiologija* (a microbiologist is not a microscopic biologist but a person specialized in the field of microbiology; microbiology is the study of microscopic organisms). As can be seen from the Russian example, subtraction differs from concatenative affixation, i.e., from affixation by addition of a discrete affix (see the *Oxford Bibliographies* article “Affixation.”) Therefore, in the literature, subtraction is seen as an instance of nonconcatenative morphology and is usually analyzed either as process morphology without morphemes or as addition of defective phonological material. Subtraction has been reported in derivation and inflection and in well-studied and lesser-studied languages. Among the most frequently cited examples of subtraction in textbooks and reference resources are the masculine forms of some French adjectives (e.g., masc. *bon* /bõ/ ‘good’—fem. *bonne* /bon/) and the formation of perfective verbs from imperfective ones in the Uto-Aztekian language Tohono O’odham (called “Papago” in some sources) (e.g., singular: imperf. *him* ‘walk’—perf. *hi:*, plural: imperf. *hihim*—perf. *hihi*). However, it has to be mentioned here that numerous studies on theoretical morphology have provided alternative, nonsubtractive analyses of those French and Tohono O’odham data. Additionally, there are different opinions on how much form can be deleted in subtraction. Some linguists claim that subtraction deletes a phoneme, others speak of a mora, and still others assume that subtractive morphology deletes segments of different lengths. Some linguists postulate subtraction only if the shortened material does not coincide with an existing morpheme elsewhere in a language, whereas others show that the deleted material can be equal in form with an existing affix. There are also different opinions on what a proper word-formation process is and which morphological derivations involve subtraction. Unlike most morphology textbooks, some theoretical studies see hypocoristics, blends, and clippings as instances of (more or less regular) word-formation and refer to them as either “subtractive truncation” or “subtractive word-formation.” Thus we come to terminology; in the literature, different labels have been used to refer to subtraction(-like) formations: minus feature, minus formation, disfixation, subtractive morph, (subtractive) truncation, backformation, or just shortening.

The Earliest Description of Subtraction

In the literature, Bloomfield 1933 is usually considered the earliest description of subtraction. Note, however, that Bloomfield did not speak of subtraction, but of “minus feature.” He illustrated the phenomenon with the forms of the French masculine adjectives that seem to be derived from their feminine counterparts by deletion of the final consonant (see the example in the annotation to Bloomfield 1933). Although most of the more recent work on subtraction doubts the correctness of Bloomfield’s analysis (see Textbooks and Most Frequently Cited Examples of Subtraction), the French masculine adjectives have become the most-cited examples of subtraction, especially in textbooks, glossaries, and reference resources. Nida 1949 seems to be the first to discuss the existence of an alternative analysis of the data from Bloomfield 1933.

Bloomfield, Leonard. 1933. *Language*. New York: H. Holt.

Reprinted in 1973 Discusses French masculine adjectives, such as *plat* /pla/ ‘flat’ (derived from the fem. *platte* /plat/), and terms the change “minus feature” (p. 217–218. The masculine adjective is formed from the feminine by deletion of the final consonant. Bloomfield’s examples have become the most frequently cited in relation to subtraction.

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

Written within the framework of American structuralist linguistics, this book focuses on issues related to identification and definition of morphemes. “Subtractive morphemes” (p. 75) are illustrated with data from Bloomfield 1933. However, the author notes that Bloomfield’s data are the result from a historical process of sound change.

Reference Resources

This section gives information on resources that provide general descriptions and discussion of subtractive morphology, such as Textbooks, Glossaries, Encyclopedias, Handbooks, and Guides.

Textbooks

Brief general descriptions of subtraction can be found in almost all morphology textbooks. However, textbooks often differ significantly with respect to what they term “subtraction,” although the definitions of subtraction they assume are more or less the same and the data analyzed also largely coincide. Of the textbooks cited in this section, Bauer 2003, Haspelmath and Sims 2010, and Fábregas and Scalise 2012 maintain that subtraction is either the only possible or at least an attractive analysis of the examples from Bloomfield 1933, cited under the Earliest Description of Subtraction. Matthews 1991 and Aronoff and Fudeman 2010, like Nida 1949 (cited under the Earliest Description of Subtraction), mention the existence

of alternative, nonsubtractive analyses and briefly discuss them. The textbooks also differ with respect to whether they subsume under subtraction cases of derivational morphology. Of the sources cited in this section, only Bauer 2003 and Fábregas and Scalise 2012 address the issue explicitly but surprisingly assume that subtraction is possible only in inflection; i.e., if a similar shortening takes place in derivational morphology, it is not subtraction but backformation. Although Fábregas and Scalise 2012 does not provide any justification of this analysis, the postulation of backformation instead of subtraction is motivated in Bauer 2003 with the fact that the shortened element coincides with or looks like an existing morph elsewhere in the language. This position is controversial because some deletions in inflection may resemble existing inflectional morphs, too.

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

This beginner-level textbook defines subtraction and addresses the possible analyses, subtractive and nonsubtractive, of frequently cited examples of subtraction from the literature (pp. 20–22, 50).

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

Subtraction is illustrated with data from Bloomfield 1933 (cited under the Earliest Description of Subtraction, pp. 38–39); the deleted material is called a “subtractive MORPH.” If the subtracted element is (or looks like) a morph with an independent existence elsewhere in the language and the process is a derivational one, the author refers to it as “backformation.”

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

This advanced-level textbook provides a very brief description of subtraction (p. 31), illustrating the latter with examples from Bloomfield 1933 (cited under the Earliest Description of Subtraction). Similar to Bauer 2003, the authors relate subtraction to backformation and claim that the former gives rise to the latter (p. 32), which is a rather controversial view.

Haspelmath, M., and A. Sims. 2010. *Understanding morphology.* 2d ed. London: Routledge.

A definition of subtraction is provided in chapter 3, “Rules” (see pp. 37–38); the examples come from Murle (cf. Payne 2006, cited under Guides). In the exercises, subtraction is suggested as an attractive analysis of the formation of the French masculine adjectives, the data from Bloomfield 1933 (cited under the Earliest Description of Subtraction).

Matthews, P. H. 1991. *Morphology: An introduction to the theory of word-structure.* 2d ed. Cambridge, UK: Cambridge Univ. Press.

Chapter 7, “Morphological Processes” (see pp. 142–143), addresses subtraction with data from Bloomfield 1933, cited under the Earliest Description of Subtraction. It is made explicit that the same facts can be

handled in an entirely contrary way, i.e., as either suffixation or subtraction.

Glossaries

Two glossaries can be particularly helpful for understanding subtraction and related concepts. However, due to the terminological issues mentioned in the Introduction and the exuberance of analyses within various frameworks, phonological and morphological alike, no glossary covers all of the terms and theories that one could confront when trying to understand subtraction. Bauer 2004 is a glossary with a focus on morphological terminology, which could be the explanation of omissions such as prosodic morphology, discussed under Subtraction as Phonology. Prosodic morphology is a theory of the morphology–phonology interface with a strong emphasis on the phonological factors that may influence morphological processes (see the explanation of the theory in Goldsmith 1995, cited under Handbooks. In the SIL Glossary of Linguistics, subtraction is illustrated with the forms of the French masculine adjectives, see Bloomfield 1933 (cited under the Earliest Description of Subtraction), but with a reference to Matthews 1991 (cited under Textbooks); and Matthews 1991 doubts the correctness of Bloomfield 1933. Like Bauer 2004, not all terms that occur in texts related to subtraction are defined in that otherwise very useful glossary.

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

This very detailed glossary has a fairly long entry on subtraction. The examples are those from Bloomfield 1933, cited under the Earliest Description of Subtraction.

SIL Glossary of Linguistic Terms.

This database compiled by SIL International provides a brief definition of subtraction with reference to Matthews 1991, cited under Textbooks.

Encyclopedias

Major encyclopedias of language and linguistics such as Asher and Simpson 1994 and Brown 2006 both have entries on subtraction. The articles are authored by leading morphologists and provide fairly lengthy and useful explanations of the phenomenon of morphological subtraction. The entries in the two encyclopedias critically assess examples of subtraction from the literature and try to set morphological subtraction apart from other shortenings that appear subtraction-like on the surface. The article on subtraction in Asher and Simpson 1994 provides something like a typology of subtraction differentiating between subtraction in inflection and subtraction in word-formation. The article in Brown 2006 doubts the subtractive character of the most popular examples of subtraction from the literature, those of the French masculine adjectives and the imperfective–perfective alternation of the Tohono O'odham verbs. See also Most Frequently Cited Examples of Subtraction.

Asher, R. E., and J. M. Y Simpson, eds. 1994. *The encyclopedia of language and linguistics*. 10 vols. Oxford: Pergamon.

The article on subtraction (vol. 8, pp. 4401–4402) by Wolfgang U. Dressler is structured around fictitious examples of subtraction as well as subtraction in inflection and word-formation. There is also a short evaluation of the phenomenon in which the possible sources of subtraction are very briefly explained.

Brown, K. 2006. *Encyclopedia of language and linguistics*. 14 vols. 2d ed. Boston: Elsevier.

The article on subtraction (vol. 12, pp. 263–265) by Laurie Bauer explicitly addresses the problem of delimiting subtraction (see Delimiting Subtraction) from other processes that remove material from a base, such as purely phonological phenomena, truncation, backformation, and clipping. It also challenges the correctness of the analysis of frequently cited examples of subtraction.

Handbooks

The two handbooks introduced in this section are profound presentations of two linguistic fields: Booij, et al. 2000–2004 is devoted to morphology; Goldsmith 1995 is on phonology. The articles in the two handbooks are authored by leading scholars in the respective fields. Booij, et al. 2000–2004 includes a special article on subtraction, whereas Goldsmith 1995 does not address subtraction explicitly but provides helpful information on theories of the interaction between phonology and morphology (see Prosodic Morphology and Templatic Morphology) that have been used for the analysis of subtraction in the literature.

Booij, G., C. Lehmann, and J. Mugdan, eds. 2000–2004. *Morphology: An international handbook on inflection and word formation*. 2 vols. Berlin: de Gruyter.

This handbook is the only resource of its type containing a comprehensive chapter devoted to subtraction. The article (vol. 1, pp. 581–587) written by Wolfgang U. Dressler discusses subtraction primarily within the framework of natural morphology (see Natural Morphology and Cognitive Linguistics). German edition: *Morphologie: Ein internationales Handbuch zur Flexion und Wortbildung*.

Goldsmith, John A., ed. 1995. *The handbook of phonological theory*. Cambridge, MA: Blackwell.

Does not include an explicit discussion of subtraction. However, chapter 9, “Prosodic Morphology” (pp. 318–366), is highly relevant to subtractive morphology because prosodic morphology has been employed by some linguists for the analysis of subtraction, hypocoristic formations, clippings, and blends. See also Subtraction as Phonology, as well as Lappe 2007, cited under Prosodic Morphology and Templatic Morphology.

Guides

Two guides deserve attention. Bauer, et al. 2013 is considered the most profound description of English morphology and is much more specialized than Payne 2006, which is a student's guide to language structure. Bauer, et al. 2013 labels "subtraction" shortenings, such as clippings and hypocoristic formations; special attention is paid to the latter type. The data come from Lappe 2007 (cited under Prosodic Morphology and Templatic Morphology), which is a description of clippings and hypocoristic forms in English in the framework of prosodic morphology. Shortenings such as *Sweden–Swede* (cf. *England–Englishman*) are not discussed in Bauer, et al. 2013, although the derivation of inhabitants is among the frequent examples of subtraction in the literature, especially in languages such as German and Italian that are closely related to English (see Dressler 2000 and Manova 2011, cited under Towards a Typology of Subtraction). Payne 2006 is an excellent guide to language structure and provides a brief description of subtraction but tries to delimit the latter from other subtraction-like shortenings, such as the formation of plural forms in languages with singulative number. In such languages, the singular is systematically marked by a special singulative affix, and plural forms are thus always shorter than the respective singular ones.

Bauer, L., R. Lieber, and I. Plag. 2013. *The Oxford reference guide to English morphology*. Oxford: Oxford Univ. Press.

Subtraction is discussed in relation to the formation of clippings and hypocoristic nouns in English. See also the discussion of such formations in Delimiting Subtraction.

Payne, Thomas. 2006. *Exploring language structure: A student's guide*. Cambridge, UK: Cambridge Univ. Press.

Subtraction is addressed on p. 44–45 with data from Murle (Nilo-Saharan Eastern Sudanic); the stem-final consonant of a noun is omitted in the plural, which is in contrast to Arbore (Cushitic) in which some singular nouns exhibit the singulative suffix *-in* and the plural forms thus appear shorter.

Monographs

Due to their nonconcatenative nature (see Nonconcatenative Morphology), subtractive formations constitute a challenge to theories of morphology and the morphology–phonology interface, which has made the discussion of subtraction a must in all theoretical accounts of morphology and the morphology–phonology interaction. Subtraction is a major argument in favor of a-morphous morphology (Anderson 1992); the latter is discussed under Process Morphology. A-morphous morphology, as the title indicates, dispenses with morphemes and relies on relations between words. Lieber 1992 explains subtraction with the help of templatic morphology (see Prosodic Morphology and Templatic Morphology). Inkelas 2014 also discusses process morphology, see Process Morphology. Stonham 1994 tackles subtraction in relation to truncation within the so-called combinatorial morphology; i.e., the idea is to reduce all morphological processes to combination. Manova 2011 explains subtraction mixing insights from natural morphology and cognitive linguistics. She sees subtraction as one of a set of morphological techniques such as addition

(i.e., affixation by addition), substitution, modification, and conversion. Like in mathematics, subtraction is the opposite of addition. Rainer 1993 does not advocate a particular theory but addresses different theoretical assumptions and provides a meticulous description of the Spanish word-formation, which exhibits a number of subtractive formations. Mel'čuk 1993–2000 provides a rather unusual analysis of subtractive morphology within his own theoretical framework, that of the meaning-text theory, and maintains that there exists not only subtraction of form but also subtraction of meaning.

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

Subtraction together with phonological processes such as apophony and metathesis are seen as evidence for morphology without morphemes, i.e., a-morphous morphology.

Inkelas, Sharon. 2014. *The interplay of morphology and phonology*. Oxford: Oxford Univ. Press.

Compares process morphology with other theories of the morphology–phonology interface. Subtraction is briefly discussed in chapter 3 in which segment deletion is exemplified with data from Tohono O'odham, Lardil, Nanti, Hausa, and Alabama.

Lieber, Rochelle. 1992. *Deconstructing morphology*. Chicago: Univ. of Chicago Press.

Subtraction is very briefly discussed in chapter 5, p. 194–195. The subtractive morphology of Koasati is seen as “a species of templatic morphology”; the latter is characterized by the fact that phonological principles play an important role in organizing morphological representations.

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

Chapter 4 is devoted to subtraction. Subtraction is the opposite of affixation by addition, and numerous examples from derivation and inflection show that the subtracted material is either a morpheme or often coincides with an existing morpheme. Affixation and subtraction may compete for the expression of the same meaning.

Mel'čuk, Igor A. 1993–2000. *Cours de morphologie générale. 5 vols.* Montreal: Presses de l'Université de Montréal.

This five-volume book is a detailed presentation of Mel'čuk's theory of morphology (see Meaning-Text Theory). Mel'čuk's views often differ from the mainstream; e.g., Mel'čuk postulates subtraction of meaning. Subtraction is discussed at various places in the different volumes. Russian translation: *Kurs obščej morfologii* (Sonderband 38. Vena, Russia: Wiener Slawistischer Almanach, 1997).

Rainer Franz 1993. *Spanische Wortbildungstheorie*. Tübingen, Germany: Niemeyer

Provides a very detailed description of the Spanish word-formation. Subtraction is defined in chapter 1, “Einführung in die allgemeine Wortbildungsllehre,” in which various examples of subtraction from the literature are also critically reviewed (p. 80–81). The examples of subtraction in Spanish are semantically classified (pp. 694–697).

Stonham, T. 1994. *Combinatorial morphology*. Amsterdam: Benjamins.

Subtraction is discussed in chapter 3, “Truncation and Subtractive Morphology,” in which a combinatorial-

morphology analysis of frequently cited examples of subtraction from the literature is provided.

Combinatorial morphology sees all morphological operations as combination.

Journals

Articles on subtraction and subtraction-like formations such as blends, clippings, and hypocoristic names, sometimes termed “subtractive word-formation” and “(subtractive) truncation” in the literature, have appeared in the following journals: *Cognitive Linguistics* (primarily articles on subtraction-like shortenings), *Journal of Slavic Linguistics* (on the so-called modern Russian vocative, the forms of which are similar to hypocoristic formations in other languages), *Morphology* (articles on subtraction-like formations), and in *Phonology* (articles that see subtraction as phonology and provide a nonsubtractive analyses in terms of concatenation of defective phonological segments, see also Subtraction as Phonology). Relevant papers published in the journals listed here are cited in the different sections of this article and can be found with the help of the search function. *Yearbook of Morphology* (the predecessor of the journal *Morphology*) is also listed here, as two of its volumes (*Yearbook of Morphology: 1995* and *Yearbook of Morphology: 1998*) include articles on subtractive morphology.

***Cognitive Linguistics*. 1990–.**

This journal is devoted to linguistic research with a focus on the interaction between language and cognition. *Cognitive Linguistics* is published by de Gruyter. Available online by subscription.

***Journal of Slavic Linguistics*. 1993–.**

This is the official journal of the Slavic Linguistics Society. It is published by Slavica Publishers. Available online by subscription.

***Morphology*. 2006–.**

Published by Springer, this journal is the successor of the *Yearbook of Morphology*. *Morphology* is devoted to morphology proper and its interfaces. Available online by subscription.

Phonology. 1984–.

Phonology provides a forum for the interchange of ideas among phonologists and those working in related disciplines. Preference is given to papers that make a substantial theoretical contribution, irrespective of the particular theoretical framework employed. Available online by subscription.

Word Structure. 2008–.

Word Structure is published by Edinburgh University Press and its scope is similar to that of the journal *Morphology*. Available online by subscription.

Yearbook of Morphology: 1995 (published in 1996). Edited by G. Booij and J. van Marle. Dordrecht, The Netherlands: Kluwer.

Contains two articles on subtractive morphology. The article by Golston and Wiese analyzes data from German dialects (see also *Yearbook of Morphology: 1998*); the second article is by Hoberman on pausal forms in Arabic.

Yearbook of Morphology: 1998 (published in 1999). Edited by G. Booij and J. van Marle. Dordrecht, The Netherlands: Kluwer.

A joint paper by Holsinger and Houseman titled “Lenition in Hessian: Cluster Reduction and ‘Subtractive Plurals’” provides an alternative analysis of the data from Golston and Wiese in *Yearbook of Morphology: 1995*.

Definition of Subtraction

This section introduces a number of theoretical issues pertinent to the proper definition of subtractive morphology. Since subtraction is an instance of Nonconcatenative Morphology, the first subsection defines this type of morphological organization, which covers not only subtraction but also umlaut, morphological metathesis, suppletion, mutation, morphological haplology or fusion, and so forth. Delimiting Subtraction tries to set subtraction apart from shortenings that resemble it very much but are not instances of subtraction proper. The final subsection addresses the correctness of the analysis of Most Frequently Cited Examples of Subtraction in the literature. Theoretical Approaches to Subtraction are discussed in a separate section.

Nonconcatenative Morphology

Subtraction falls under nonconcatenative morphology. In contrast to concatenative morphology that involves prefixation and suffixation, nonconcatenative morphology cannot be analyzed in terms of concatenation of discrete elements such as morphemes (see the explanations of nonconcatenative

morphology in McCarthy 1981, Kurisu 2001, and Davis and Tsujimura 2014). McCarthy 1981 analyzes nonconcatenative morphology with the help of the theory of prosodic morphology and in terms of templates (see Prosodic Morphology and Templatic Morphology). Davis and Tsujimura 2014 defines two distinct types of nonconcatenative morphology: templatic and a-templatic. In the templatic type, either morphological exponence of a category is expressed by an invariant prosodic shape (e.g., the root-and-pattern system of the Semitic languages) or a concatenative affix imposes a templatic subcategorization requirement on the base to which it attaches (e.g., in terms of a subcategorization frame associated with that affix). A-templatic nonconcatenative morphology (also analyzed in Kurisu 2001) includes phenomena such as subtractive morphology, moraic augmentation, and autosegmental affixation. Nonconcatenative morphology appears more compatible with process-based approaches to morphology (see Process Morphology), whereas concatenative morphology is more in line with item-and-arrangement (piece-based) approaches (Hockett 1954). Some recent theoretical proposals try to unify concatenative and nonconcatenative morphology under a single theoretical approach and thus maintain that nonconcatenative morphology is theoretically epiphenomenal (Bye and Svenonius 2012).

Bye, Patrik, and Peter Svenonius. 2012. Non-concatenative morphology as epiphenomenon. In *The morphology and phonology of exponence*. Edited by Jochen Trommer, 427–495. Oxford: Oxford Univ. Press.

Mixing insights from nanosyntax, phase theory, and nonstandard versions of distributed morphology, the authors maintain that the theoretical distinction between concatenative and nonconcatenative morphology is epiphenomenal. There is no nonconcatenative morphology, only nonconcatenative effects (cf. Trommer and Zimmermann 2014, cited under Generalized Nonlinear Affixation).

Davis, Stuart, and Natsuko Tsujimura. 2014. Non-concatenative derivation: Other processes. In *The Oxford handbook of derivational morphology*. Edited by Rochelle Lieber and Pavol Štekauer, 190–218. Oxford: Oxford Univ. Press.

Introduces nonconcatenative morphology. Although this article is published in a handbook of derivational morphology, the data considered are primarily inflectional. Subtraction is analyzed along with moraic augmentation and autosegmental affixation and seen as a-templatic nonconcatenative morphology.

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

This article introduces item-and-arrangement and item-and-process models of grammar; the latter has been claimed to be more appropriate for the description of nonconcatenative morphology, including subtraction.

Kurisu, K. 2001. The phonology of morpheme realization. Rutgers Optimality Archive 490. PhD diss., Univ. of California, Santa Cruz.

Develops a realizational morphology theory in which the Realize Morpheme (RM) constraint plays a central role. RM requires every morpheme in the underlying representation to receive some phonological

exponence on the surface; RM does not determine the phonological exponence. A-templatic nonconcatenative morphology is derived through the ranking RM >> Faith(fullness).

McCarthy, John J. 1981. A prosodic theory of nonconcatenative morphology. *Linguistic Inquiry* 12.3: 373–418.

This article is not on subtraction but explains concatenative and nonconcatenative morphology and proposes the theory of prosodic morphology, which has played a central role in the analyses of subtraction-like shortenings. The paper draws on data from the verb morphology of Classical Arabic.

Delimiting Subtraction

Some scholars differentiate between subtraction and other shortenings, such as purely phonological deletion of form (when individual segments are deleted at morphological or syntactic boundaries for phonological reasons), truncation, backformation, clipping, hypocoristics, and blends (Bauer 2006). In Dressler 2000, subtraction is also set apart from “other types of abbreviation” and from conversion in the inflecting-fusional type in Manova and Dressler 2005. In addition to the already mentioned subtraction-like shortenings, Manova 2011 addresses haplogy and critically assesses the relation between subtraction and rule inversion as well as Mel'čuk's proposal for subtraction of meaning (Mel'čuk 1993–2000, cited under Meaning-Text Theory). With respect to hypocoristics, blends, and clippings, we speak of subtraction-like shortenings because they do not entail the semantic change typical of morphological processes in word-formation and inflection (see also the motivation of the so-called “oddities” in Aronoff 1976, pp. 20–21). It is questionable whether the input and the output of such shortenings exhibit any semantic difference at all, as the referential meaning remains unchanged. This issue is addressed in Alber and Arndt-Lappe 2012 in which the authors propose to allow morphology to make reference to pragmatic function, as shortenings are usually restricted to informal style. However, it is unclear how the proposal for allowing morphology to make reference to pragmatic function should be applied to regular affixation in word-formation and inflection that expresses categorical and grammatical meanings. Special attention should also be paid to truncation, since theoretical studies of the phonology-morphology interface, especially within prosodic morphology, often refer to nonconcatenative changes in language's morphology as “truncation.” The rule of truncation is defined in Aronoff 1976 with derivations such as *nomin-ate* → **nomin-ate* + -ee → *nomin-ee* in which the suffix -ee truncates the suffix -ate; i.e., the derivation takes place through addition of the second suffix and does not have anything to do with subtraction. Couched in a prosodic-morphology framework, Alber and Arndt-Lappe 2012 differentiates between templatic truncation (the size of the derivative is predictable, illustrated with Spanish hypocoristics, which conform to the structure of a disyllabic trochaic foot) and subtractive truncation (the size of the truncated material is predictable, illustrated with subtraction of stem-final rime in Koasati plurals). Thus, the reader should be careful which of the three different types of truncation (Aronoff's, templatic, or subtractive) is addressed in a study.

Alber, Birgit, and Sabine Arndt-Lappe. 2012. Templatic and subtractive truncation. In *The morphology and phonology of exponence*. Edited by Jochen Trommer, 289–325. Oxford: Oxford

Univ. Press.

Differentiates between templatic and subtractive truncation. The output of a templatic truncation conforms to a prosodic template, which makes the size of the derivative predictable; in subtractive truncation, the size of the truncated material is predictable (cf. "truncation" in Aronoff 1976, p. 88). Both types of truncation have been labeled "subtraction" in the literature.

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

Among other things, this influential book defines "truncation": the addition of an affix truncates another affix from the base.

Bauer, Laurie. 2006. Subtraction. In *Encyclopedia of language and linguistics*. Vol. 12. 2d ed.

Edited by K. Brown, 263–265. Boston: Elsevier.

"Morphological subtraction includes a number of phenomena which may be viewed as taxonomically distinct" (p. 263). Those phenomena involve processes that remove material from a base, such as purely phonological changes, truncation, backformation, and clipping.

Dressler, W. U. 2000. Subtraction. In *Morphology: An international handbook on inflection and word formation*. Vol. 1. Edited by G. Booij, C. Lehmann, and J. Mugdan, 581–587. Berlin: de Gruyter.

Points out fictitious examples of subtraction such as backformation, clippings, and other types of abbreviations, suppletion, conversion, and truncation.

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

Discussion of why subtraction should be set apart from a number of other changes such as phonological shortening, backformation, haplogy, hypocoristics (including the modern Russian vocative), clipping, blends, acronyms, subtraction of meaning, zero sign, and truncation.

Manova, Stela, and Wolfgang U. Dressler. 2005. The morphological technique of conversion in the inflecting-fusional type. In *Approaches to conversion/zero-derivation*. Edited by Laurie Bauer and Salvador H. Valera, 67–102. Münster, Germany, and New York: Waxmann.

Conversion in the inflecting-fusional type often involves deletion of inflection, which has made some authors speak of subtraction instead of conversion. The paper clarifies such confusions.

Most Frequently Cited Examples of Subtraction

This section focuses on the two most-cited examples of subtraction in the literature: (1) the French masculine adjectives such as *bon* [bõ] 'good' (fem. *bonne* [bon]) in Bloomfield 1933, cited under the Earliest Description of Subtraction; and (2) Tohono O'odham (called "Papago" in some studies) verb morphology that illustrates subtraction in Anderson 1992, cited under Monographs. Anderson 1992 is not the first to cite the Tohono O'odham verbs in relation to subtraction; yet, most recent studies relate Tohono O'odham examples to his 1992 monograph on a-morphous morphology. Intriguingly, although French adjectives and Tohono O'odham verbs have received a number of alternative analyses, they remain the most-cited examples of subtraction in the literature. The French adjectives are the preferred examples of subtraction in textbooks, glossaries, and guides, whereas theoretical studies usually test their claims against the Tohono O'odham verbs. Thus, the goal of this section is to alert the reader one more time about the existence of fictitious examples of subtraction. The number of scholars and the variety of the arguments that speak against subtraction analyses of the two most-cited examples of subtraction is more than striking. French adjectives have been reanalyzed in Aronoff and Fudeman 2010, Bauer 2006, Dressler 2000, Manova 2011, and Stonham 1994, among others; Papago verbs have been reanalyzed in Aronoff and Fudeman 2010, Lombardi and McCarthy 1991, Stonham 1994, Manova 2011, and Trommer and Zimmermann 2014, among others. The exact arguments are mentioned in the annotations.

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

Discusses the possible analyses, subtractive and nonsubtractive, of the French masculine adjectives (one of the alternative analyses assumes the existence of two different stems, pp. 20–22) and the Tohono O'odham verbs (alternative analysis in terms of something like "a negative final consonant," p. 50).

Bauer, Laurie. 2006. Subtraction. In *Encyclopedia of language and linguistics*. Vol. 12. 2d ed. Edited by K. Brown, 263–265. Boston: Elsevier.

Mentions psycholinguistic evidence for the nonsubtractive character of the French masculine adjectives; i.e., native speakers of French do not employ subtraction but suffixation for the production of those adjectives.

Dressler, W. U. 2000. Subtraction. In *Morphology: An international handbook on inflection and word formation*. Vol. 1. Edited by G. Booij, C. Lehmann, and J. Mugdan, 581–587. Berlin: de Gruyter.

The pattern of the French adjectives is no more productive. Masculine forms are the bases; the feminine forms are suppletive and rote learned.

Lombardi, Linda, and John McCarthy. 1991. Prosodic circumscription rules. *Phonology* 8.1: 37–72.

Outlines the phonological theory of prosodic circumscription ("a morphological operation can apply to a prosodically delimited constituent within a morphological base rather than to the morphologically delimited base as a whole," p. 38). Tohono O'odham (Papago) verb morphology is analyzed in terms of truncation.

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

Based on morphosemantic markedness, this book doubts the correctness of the direction of derivation and thus the subtractive character of both the French masculine adjectives and the Tohono O'odham perfective verbs, discussed in chapter 4.

Stonham, T. 1994. *Combinatorial morphology*. Amsterdam: Benjamins.

As French masculine adjectives such as *bon* 'good' can be pronounced as either [bō] or [bon], depending on the following noun: *bon père* [bō pɛr] 'good father', *bonne mère* [bon mɛr] 'good mother', *bon homme* [bon om] 'good man', the subtractive analysis of the masculine adjectives cannot be correct.

Trommer, Jochen, and Eva Zimmermann. 2014. Generalised mora affixation and quantity-manipulating morphology. *Phonology* 31.3: 463–510.

The authors advocate the so-called Generalized Nonlinear Affixation approach and provide an alternative, phonology-based analysis of the examples of subtraction from Tohono O'odham. Subtraction is an additive rule; specifically, it is the phonological response to the addition of an abstract empty mora.

Theoretical Approaches to Subtraction

In this section, various theoretical approaches to subtractive morphology are introduced: Process Morphology, Natural Morphology and Cognitive Linguistics, Meaning-Text Theory, and, the latter with subsections on Prosodic Morphology and Templatistic Morphology, Subtraction in Optimality Theory (OT), and Generalized Nonlinear Affixation. All approaches address subtractive morphology through the fact that some morphosemantic change is expressed through deletion of form. This is modeled either directly—i.e., by acknowledging subtraction of form—or indirectly—i.e., in terms of addition of defective phonological material or based on the observation that the input and the output of the subtractive rule use different phonological forms. Meaning-Text Theory also claims for subtraction of meaning.

Process Morphology

The item-and-process approach (Hockett 1954), termed also “process morphology” in the literature (e.g., Inkelas 2014), sees morphology not as concatenation of morphemes but as a process operating on a morphological base. Process morphology is considered more appropriate for description of subtraction than piece-based (item-and-arrangement, Hockett 1954) morphology. Thus the analysis of subtractive morphology within process morphology directly derives from the fact that subtraction is an instance of nonconcatenative morphology (see Nonconcatenative Morphology). A helpful discussion of process morphology is provided by Inkelas 2014 who relates process morphology to other theories of the morphology–phonology interface. Employing insights from item-and-process and word-and-paradigm

approaches (for an illustration of the latter type, see Matthews 1991, cited under Textbooks), Anderson 1992 proposes the so-called a-morphous morphology. Word-and-paradigm approaches to morphology deny the morpheme as a basic sign; the base of all morphological changes is the word, and the word's paradigm plays an important role in the analysis. In Anderson 1992, subtractive morphology is among the major arguments in favor of a-morphous morphology.

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

Presents the theory of a-morphous morphology, a realizational theory of morphology that does not operate with morphemes. Subtractive morphology is claimed to provide major evidence in support of this theory.

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

This article proposes the item-and-arrangement and item-and-process models of grammar.

Inkelas, Sharon. 2014. *The interplay of morphology and phonology*. Oxford: Oxford Univ. Press.

Some morphology is processual; i.e., it is visible through a constant change in the base of affixation rather than through the addition of an affix (see chapters 3, 4, and 5).

Natural Morphology and Cognitive Linguistics

Based on the semiotic principle of constructional diagrammaticity (correspondence between meaning and form) and other naturalness parameters, Dressler 1987 provides an analysis of subtraction within natural morphology in terms of anti-diagrammaticity; i.e., affixation is diagrammatic, whereas subtraction as its negation represents anti-diagrammaticity. Diagrammaticity is natural; anti-diagrammaticity is unnatural. Manova 2011 merges principles and assumptions from natural morphology and cognitive linguistics and postulates a set of five morphological techniques: addition ($X \rightarrow X + Y$), substitution ($X + Y \rightarrow X + Z$), modification ($X \rightarrow X'$), conversion ($X \rightarrow X$), and subtraction ($XY \rightarrow X$ or $X \rightarrow X - Y$). These techniques are defined on the basis of the cognitive effort they require: addition being the easiest technique, and subtraction the most complex one cognitively. The five techniques operate on roots, stems, and words in word-formation and inflection, derive the whole range of forms in morphology, and may compete for the expression of the same semantics. As typical of cognitive linguistics, Gries 2006 follows a bottom-up approach. He investigates subtraction-like shortenings such as blends and complex clippings (the term Gries uses) with the help of large corpora. His examples are not considered instances of subtraction in Dressler 1987 and Manova 2011; see also Delimiting Subtraction. The idea in Gries 2006 is to establish statistically what can be deleted and what must be preserved from the source form in subtractive word-formation. It is claimed that such bottom-up investigations are indicative of the psycholinguistic processing of subtractive morphology.

Dressler, W. U. 1987. Word formation (WF) as part of natural morphology. In *Leitmotive in natural*

morphology. By Wolfgang U. Dressler, Willi Mayerthaler, Oswald Panagi, and Wolfgang U. Wurzel, 99–126. Amsterdam: Benjamins.

Subtraction is anti-diagrammatic—i.e., unnatural—and therefore rare in the languages of the world.

Gries, S. T. 2006. Cognitive determinants of subtractive word-formation: A corpus-based perspective. *Cognitive Linguistics* 17.4: 535–558.

Discussion of blends and complex clippings. Uses a corpus-based approach to establish recognition points (RPs), i.e., what portion of a source word is necessary for the recognition of that word. Maintains that RP plays a role in subtractive word-formation, especially in blending.

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

Subtraction is one of a set of five morphological techniques that operate in word-formation and inflection. The techniques are established on the basis of the cognitive effort they require. As in mathematics, subtraction is the opposite of (affixation by) addition and more complex cognitively than the latter.

Meaning-Text Theory

Because linguistics signs have form (signifier) and meaning (signified), Mel'čuk 1991 proposes an analysis of subtraction in terms of subtraction of meaning. The idea is also discussed in his impressive book on morphology couched within his own meaning-text theory (Mel'čuk 1993–2000). Mel'čuk maintains that there is subtraction that affects the signifier and also subtraction of the signified. This approach is thus in contrast to the other analyses of subtraction in the literature that only refer to shortening of the signifier. In Mel'čuk 1991, subtraction of meaning is, among other examples, illustrated with the Russian reflexive suffix *-sja* when it attaches to causative verbs as in *serdit'* ‘to make angry = to cause to be angry’ versus *serdit'sja* ‘to be angry’. According to Mel'čuk, the signified of the additive *-sja* is ‘cause.’ A critical assessment of Mel'čuk’s idea of subtraction of meaning can be found in Manova 2011, cited under Natural Morphology and Cognitive Linguistics. Mel'čuk 1991 also provides something like a typology of “subtractive signifieds” and “subtractive signifiers.”

Mel'čuk, I. A. 1991. Subtraction in natural language. In *Words are physicians for an ailing mind: For Andrzej Bogusławski on the occasion of his 60th birthday*. Edited by Mieciej Grochowski and Daniel Weiss, 279–293. Sagners Slavistische Sammlung 17. Munich: Sagner.

Subtraction can affect both sides of a linguistic sign—the signifier and the signified. Thus, in parallel to subtraction of form, subtraction of meaning is proposed.

Mel'čuk, Igor A. 1993–2000. *Cours de morphologie générale*. 5 vols. Montreal: Presses de

I'Université de Montréal.

This five-volume set is a detailed presentation of Mel'čuk's theory of morphology. Mel'čuk's views often differ from the mainstream. Subtraction is discussed at various places in the different volumes. Russian translation: *Kurs obščej morfologii* (Sonderband 38. Vena, Russia: Wiener Slawistischer Almanach, 1997).

Subtraction as Phonology

Incremental theories of grammar that assume syntax-like step-by-step derivation of language structure run into trouble when analyzing subtractive shortenings. Such theories do not have a morphological component but allow only for phonological and syntactic rules. As syntax cannot derive nonconcatenative structures, nonconcatenative morphology is modeled in terms of phonology. Within Optimality Theory (OT), analyses of subtraction rely on the Realize Morpheme (RM) constraint (ranked over some phonological faithfulness constraint) as well as on the anti-faithfulness constraint MAX, i.e., \neg MAX, which is the negation of MAX = Maximize all input segments in the output. RM and MAX are thus entirely compatible with an item-and-arrangement view of morphology (see Process Morphology). Analyses within distributed morphology assume addition of defective phonology (empty phonological units) and are, like the OT analyses, of the item-and-arrangement type.

Prosodic Morphology and Templatistic Morphology

Prosodic morphology is a theory of morphology–phonology dependencies that relies on templates and circumscription (see the explanation of the theory in Goldsmith 1995, cited under Handbooks). Templates and circumscription rules are defined in terms of authentic units of prosody such as mora (μ), syllable (σ), foot (F), and prosodic word (PrWd). McCarthy and Prince 1990 defines the foundations of prosodic morphology. Lieber 1992 employs templatistic morphology, and Lombardi and McCarthy 1991 discusses prosodic circumscription rules: “a morphological operation can apply to a prosodically delimited constituent within a morphological base rather than to the morphologically delimited base as a whole” (p. 38). Lappe 2007 is the most comprehensive analysis of truncatory (subtraction-like) patterns in English within prosodic morphology.

Lappe, Sabine. 2007. *English prosodic morphology*. Dordrecht, The Netherlands: Springer.

Provides a comprehensive and strongly empirically based analysis of truncatory patterns in English, such as monosyllabic truncated names, y-hypocoristics, and clippings. The author does not use the term “subtraction/subtractive” in this book (cf. Alber and Arndt-Lappe 2012, cited under Delimiting Subtraction, in which truncation is divided into templatistic and subtractive).

Lieber, Rochelle. 1992. *Deconstructing morphology*. Chicago: Univ. of Chicago Press.

Provides an incremental analysis and consequently explains subtraction in terms of templatistic morphology (see chapter 5, “Beyond Affixation and Compounding”).

Lombardi, Linda, and John McCarthy. 1991. Prosodic circumscription rules. *Phonology* 8.1: 37–72.

Outlines the so-called prosodic circumscription theory with the help of which a range of examples of subtraction from the literature are reanalyzed.

McCarthy, John, and Alan Prince. 1990. Prosodic morphology and templatic morphology. In *Perspectives on Arabic linguistics II: Papers from the Second Annual Symposium on Arabic Linguistics*. Edited by Mushira Eid and John McCarthy, 1–55. Amsterdam: Benjamins.

The founders of prosodic morphology define templatic morphology within prosodic theory and maintain that templates must be analyzed in prosodic terms. Both prosodic morphology and templatic morphology have been used in the literature for analyses of subtraction-like formations.

Subtraction in Optimality Theory

Unlike theories that rely on rules, Optimality Theory (OT) operates with markedness and faithfulness constraints. The role of the markedness constraints is to penalize phonologically marked structures or representations, whereas the role of the faithfulness constraints is to demand the identity of two corresponding structures or representations. Constraints are universal, but the different languages may use different rankings of those constraints. The major idea in Horwood 2001 is that “an Optimality-theoretic grammar is not limited to only two constraint types—faithfulness and markedness—but rather must admit anti-faithfulness constraints” (p. 3). Horwood 2001 proposes the anti-faithfulness constraint $\neg\text{MAX}$, which is the negation of $\text{MAX} = \text{Maximize all input segments in the output}$. $\neg\text{MAX}$ penalizes any candidate “whose output segmentism is maximally identical to that of some corresponding output base; if a single segment of the corresponding output base is not present in the surface form of the derived word, the constraint will be satisfied” (p. 4). Subtraction would satisfy such a constraint because the surface representation lacks segments that were present underlyingly (or in the corresponding output base). Kurisu 2001 differentiates between non-faithfulness constraints (in regular phonology) and anti-faithfulness constraints (in nonconcatenative morphology), but the author claims against the anti-faithfulness approach and proposes an analysis of nonconcatenative morphology (see Nonconcatenative Morphology), including subtraction, based on the morphological constraint Realize Morpheme (RM) ranked over some phonological faithfulness constraint, i.e., RM >> Faith. (Kurisu’s definition of RM is: “Let α be a morphological form, β be a morphosyntactic category, and $F(\alpha)$ be the phonological form from which $F(\alpha + \beta)$ is derived to express a morphosyntactic category β . Then RM is satisfied with respect to β iff $F(\alpha + \beta) \neq F(\alpha)$ phonologically” (Kurisu 2001, p. 39)).

Horwood, G. 2001. Anti-faithfulness of subtractive morphology. *Rutgers Optimality Archive* 466.

Analyzes data from Koasati, Tohono O’odham (Papago), and Lardil without reference to the syllable or rhyme template. High-ranked anti-MAX constraints are operative on the Output-Output-correspondence relation of the singular/plural paradigm (in Koasati), forcing truncation of at least one segment in the derived word in a manner restricted by more general phonological constraints on the grammar.

Kurisu, K. 2001. The phonology of morpheme realization. PhD diss., Univ. of California, Santa Cruz.

The entire range of a-templatic nonconcatenative morphology (see Nonconcatenative Morphology) is derived through the ranking RM >> Faith, RM = Realize Morpheme constraint. Special attention is paid to subtractive morphology and umlaut.

Generalized Nonlinear Affixation

The Generalized Nonlinear Affixation approach (Bermúdez-Otero 2012) addresses issues of the morphology–phonology interface, maintaining that there is no nonconcatenative morphology (see also Bye and Svenonius 2012, cited under Nonconcatenative Morphology). According to the Generalized Nonlinear Affixation approach, nonconcatenative morphology is the result of concatenation of defective phonological material that causes adjustments in phonology. Following Bermúdez-Otero 2012, Trommer and Zimmermann 2014 proposes the so-called Generalized Mora Affixation approach according to which subtraction is the phonological response to the addition of an abstract empty mora; i.e., this approach accounts only for a specific type of subtraction.

Bermúdez-Otero, Ricardo. 2012. The architecture of grammar and the division of labor in exponence. In *The morphology and phonology of exponence*. Edited by Jochen Trommer, 8–83. Oxford: Oxford Univ. Press.

The article is not on subtraction but outlines the Generalized Nonlinear Affixation approach that can be used for the (re)analysis of examples of subtraction(-like) shortenings (see Trommer and Zimmermann 2014). Critically assesses the process approaches to morphology, including a-morphous morphology (Anderson 1992, cited under Process Morphology.)

Trommer, Jochen, and Eva Zimmermann. 2014. Generalised mora affixation and quantity-manipulating morphology. *Phonology* 31.3: 463–510.

Based on the Generalized Nonlinear Affixation approach, subtraction is seen as the phonological response to the addition of an abstract empty mora; i.e., this proposal analyzes only a certain type of subtraction, and the analysis cannot account for instances in which a language shortens more than a mora.

Towards a Typology of Subtraction

Summing up observations about the nature and the scope of subtraction from the literature, this section is an attempt at a typology of subtraction. With respect to domain of operation, subtraction has been reported in word-formation (Rainer 1993, Dressler 2000, Manova 2011, Alber and Arndt-Lappe 2012, among others) and in inflection (Bauer 2003, as well as the majority of the works that analyze data from lesser-studied languages). With respect to how much material can be deleted, most studies on subtraction

in inflection seem to assume that subtraction deletes a single phoneme (or a mora in some approaches, see Generalized Nonlinear Affixation). Other studies on subtraction in word-formation usually provide examples in which subtraction deletes segments that are larger than a phoneme. Manova 2011 maintains that the deleted material often coincides with an existing morpheme. With respect to bases, although most studies see subtraction as a word-based morphological process, Manova 2011 speaks of word-, stem-, and root-based subtraction and establishes that root-based subtractions are extremely rare. This finding is explained with the fundamental status of roots in morphology (cf., e.g., in distributed morphology, Halle and Marantz 1993). Regarding typical meanings derived by subtraction, Dressler 2000 provides the following list: (1) in inflection: nominal plural in German dialects, verbal plural in the Muskogean languages, verbal aspect in Tohono O'odham, and vocatives and imperatives in several languages; and (2) in word-formation: deverbal action nouns in Icelandic and Romanian; augmentatives in Polish and other Slavic languages; agent nouns related to Latinate names of profession; designations of inhabitants of countries, regions, and communities; and adjectives formed from toponyms. In a detailed study of subtraction in three Slavic languages, Manova 2011 finds that the following categories exhibit subtractive morphology: (1) in inflection: plural of ethnicity terms and comparative and superlative forms of adjectives; (2) in word-formation: word-class changing subtraction—N > V, N > ADJ, and ADJ > V; and in word-class preserving subtraction: nominal diminutives, the science-scientist pattern, and ethnicity terms. With respect to morphological language type, Dressler 2000 claims that subtraction does not occur in agglutinating and non-fusional languages. However, Manova 2011 could not find any relation between fusion of exponence and subtraction in the three inflecting-fusional languages that were investigated. Thus, the relation between subtraction and language type, if any, remains unclear. Regarding productivity, subtraction is, as a rule, considered unproductive (Dressler 2000 and Manova 2011). However, assuming that all hypocoristic formations and clippings are derived by subtractions (Alber and Arndt-Lappe 2012, see also Delimiting Subtraction), subtraction will immediately turn into a very productive process.

Alber, Birgit, and Sabine Arndt-Lappe. 2012. Templatric and subtractive truncation. In *The morphology and phonology of exponence*. Edited by Jochen Trommer, 289–325. Oxford: Oxford Univ. Press.

Sees hypocoristics and clippings as instances of templatric and subtractive truncation in word-formation.

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

Allows only subtraction in inflection. If the subtracted element is (or looks like) a morph with an independent existence elsewhere in the language and the process is a derivational one, the author refers to it as “backformation.”

Dressler, W. U. 2000. Subtraction. In *Morphology: An international handbook on inflection and word formation*. Vol. 1. Edited by G. Booij, C. Lehmann, and J. Mugdan, 581–587. Berlin: de Gruyter.

Discusses typical meanings of subtraction from a cross-linguistic perspective. Differentiates between typical meanings in inflection and in word-formation.

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.

The foundational work on distributed morphology.

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

Illustrates subtraction in word-formation and inflection, as well as root-, stem-, and word-based subtraction. Shows that subtraction often deletes material that coincides phonologically with an existing morpheme. Provides a list of categories derived by subtraction in the three languages under investigation and evaluates their productivity.

Rainer, Franz. 1993. *Spanische Wortbildungslehre*. Tübingen, Germany: Niemeyer.

Provides numerous examples of subtraction in word-formation in Spanish (see chapter 6, “Varia,” pp. 694–697); also cf. Bauer 2003, which claims that there is only subtraction in inflection. Rainer’s data are also semantically classified.

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