

VOLUME FOUR

ENCYCLOPEDIA OF LANGUAGE & LINGUISTICS

SECOND EDITION

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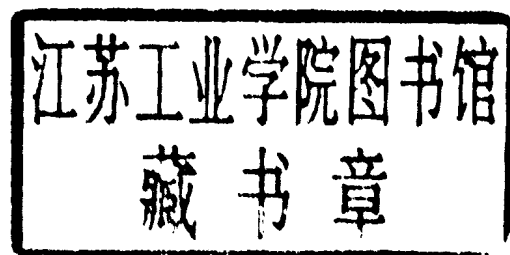
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GUIDE TO USE OF THE ENCYCLOPEDIA

Structure of the Encyclopedia

The material in the Encyclopedia is arranged as a series of articles in alphabetical order. To help you realize the full potential of the material in the Encyclopedia we have provided several features to help you find the topic of your choice: an Alphabetical list of Articles, a Subject Classification, Cross-References and a Subject Index.

1. Alphabetical List of Articles

Your first point of reference will probably be the alphabetical list of articles. It provides a full alphabetical listing of all articles in the order they appear within the work. This list appears at the front of each volume, and will provide you with both the volume number and the page number of the article.

Alternatively, you may choose to browse through the work using the alphabetical order of the articles as your guide. To assist you in identifying your location within the Encyclopedia, a running head line indicates the current article.

You will also find 'dummy entries' for certain languages for which alternative language names exist within the alphabetical list of articles and body text.

For example, if you were attempting to locate material on the *Apalachee* language via the contents list, you would find the following:

Apalachee *See* Muskogean Languages.

The dummy entry directs you to the *Muskogean Languages* article.

If you were trying to locate the material by browsing through the text and you looked up *Apalachee*, you would find the following information provided in the dummy entry:

Apalachee <i>See</i> : Muskogean Languages.
--

2. Subject Classification

The subject classification is intended for use as a thematic guide to the contents of the Encyclopedia. It is divided by subject areas into 36 sections; most sections are further subdivided where appropriate. The sections and subdivisions appear alphabetically, as do the articles within each section. For quick reference, a list of the section headings and subheadings is provided at the start of the subject classification.

Every article in the encyclopedia is listed under at least one section, and a large number are also listed under one or more additional relevant sections. Biographical entries are an exception to this policy; they are listed only under biographies. Except for a very few cases, repeat entries have been avoided within sections, and a given

article will appear only in the most appropriate subdivisions. Again, biographical entries are the main exception, with many linguists appearing in several subdivisions within biographies.

As explained in the introduction to the Encyclopedia, practical considerations necessitate that, of living linguists, only the older generation receive biographical entries. Those for members of the Encyclopedia's Honorary Editorial Advisory Board and Executive Editorial Board appear separately in Volume 1 and are not listed in the classified list of entries.

3. Cross-References

All of the articles in the Encyclopedia have been extensively cross-referenced. The cross-references, which appear at the end of each article, serve three different functions. For example, at the end of *Norwegian* article, cross-references are used:

1. to indicate if a topic is discussed in greater detail elsewhere

Norwegian

See also: Aasen, Ivar Andreas (1813–1896); Danish; Inflection and Derivation; Language/Dialect Contact; Language and Dialect: Linguistic Varieties; Morphological Typology; **Norway: Language Situation**; Norse and Icelandic; Scandinavian Lexicography; Subjects and the Extended Projection Principle; Swedish.

2. to draw the reader's attention to parallel discussions in other articles

Norwegian

See also: Aasen, Ivar Andreas (1813–1896); **Danish**; Inflection and Derivation; Language/Dialect Contact; Language and Dialect: Linguistic Varieties; Morphological Typology, **Norway: Language Situation**; **Norse and Icelandic**; **Scandinavian Lexicography**; Subjects and the Extended Projection Principle; **Swedish**.

3. to indicate material that broadens the discussion

Norwegian

See also: **Aasen, Ivar Andreas (1813–1896)**; **Danish**; **Inflection and Derivation**; **Language/Dialect Contact**; **Language and Dialect: Linguistic Varieties**; **Morphological Typology**; **Norway: Language Situation**; **Norse and Icelandic**; **Scandinavian Lexicography**; **Subjects and the Extended Projection Principle**; **Swedish**.

4. Subject Index

The index provides you with the page number where the material is located, and the index entries differentiate between material that is an entire article, part of an article, or data presented in a figure or table. Detailed notes are provided on the opening page of the index.

Other End Matter

In addition to the articles that form the main body of the Encyclopedia, there are 176 Ethnologue maps; a full list of contributors with contributor names, affiliations, and article titles; a List of Languages, and a Glossary. All of these appear in the last volume of the Encyclopedia.

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Du Cange, Charles du Fresne, Sieur (1610–1688)

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Sieur Charles du Fresne Du Cange was a scholar, historian and lexicographer, friend of Bernard de Montfaucon (1655–1741), the founder of scientific palaeography and codicology. Du Cange came from a wealthy family, which was for centuries in the service of the royal house of France. He was born in 1610 in Amiens and attended the Jesuit college in his hometown, studied law in Orleans, and finally became an advocate, a profession which he never practiced. In 1638, he married Catherine Dupos, daughter of the treasurer of Amiens; in 1645 he succeeded his father-in-law in this position, dying in 1688 in the same town.

The circumstances of Du Canges's life enabled him to devote himself to the study of history. His research involved both the regional and the general history of France, about which he produced numerous treatises. His scholarly activities extended also to the study of Byzantine history, resulting in the editing of original sources as well as personal works on the field. Especially noteworthy is his edition of the Byzantine historian Johannes Zonaras's *Annales ab exordio mundi ad mortem Alexii Comnenis graece et latine cum notis*, and his contribution in the 42-volumed *Corpus Parisinum* of Byzantine historians, a work commissioned by Louis XIV, alongside several other important scholars of his time. Du Canges's name, however, is mainly connected with his two dictionaries, one about medieval Latin (1678), the other about the Byzantine Greek language (1688). He compiled his lexica based on his own research of the various sources, which he drew directly from the original manuscripts and not from later, edited editions, which did not yet exist for these specific authors. Due to the peculiarity of his field of research, and to the fact that the medieval Latin and Byzantine lexi-

cography attracted scholarly interest relatively late by comparison to the lexicography of the classical languages, his dictionaries remain an invaluable work of reference. Du Canges's studies go beyond the Greek and Latin languages, as was eloquently demonstrated by his posthumous work entitled *Illiricum vetus et novum* (ed. by Keglevick de Buzin, 1746), dealing with the Illyrian language.

See also: Lexicography: Overview.

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Dual-Mechanism Morphology

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Our understanding of how an adult native speaker/hearer processes inflected word forms in real time has increased considerably over the last decade. Experimental studies using a range of different

psycholinguistic methods and techniques, e.g., lexical decision, priming, and event-related potentials (ERPs), have led to a number of consistent and replicable results such as frequency effects for inflected word forms in lexical decision tasks, priming effects for inflected word forms in different kinds of priming experiments, and left-anterior negativities for incorrectly inflected word forms in ERP violation studies;

see Clahsen (1999) and Pinker (1999) for review. The theoretical interpretation of these and other results on morphological processing in adult native speakers is controversial; basically, three different approaches can be distinguished. On one side are different kinds of associative single-mechanism models claiming that all inflected words are stored and processed within a single associative system using distributed representations (see, e.g., Bybee, 1995; Sereno and Jongman, 1997, among others). The morphological structure of an inflected word is not explicitly represented in these models; instead, these models implement networks that represent the mapping relationship between different word forms through associatively linked orthographic, phonological and semantic codes. A radical alternative to these models are rule-based single-mechanism accounts in which all inflected words are formed by morphophonological rules, and memorization of inflected words is avoided as much as possible. Halle and Mohanan (1985) and related work in generative phonology in which minor rules are proposed (for example, *Lowering ablaut* deriving the past tense form *sang* from the stem *sing*) are representative of this approach; see Yang (2000) for a recent treatment of the English past tense in this framework. The third theoretical viewpoint is represented by a family of dual-mechanism models, which hold that morphologically complex word forms can be processed both associatively, i.e., through stored full-form representations and by rules that decompose or parse inflected word forms into morphological constituents (Chialant and Caramazza, 1995; Schreuder and Baayen, 1995; Clahsen, 1999; Pinker, 1999, among others). Here, we provide a brief overview of different variants of dual-mechanism models that are currently being discussed in the literature.

There is a class of dual-route models specifically concerned with the kinds of mental representation listeners consult in recognizing morphologically complex words. As is common in word-recognition research, modality-specific access representations are assumed to mediate the mapping from the orthographic or spoken input onto lexical representations in the central lexicon. Dual-route models posit that morphologically complex words can be recognized either via prelexical morphological parsing, which decomposes the orthographic or spoken input into its morphological components, or via a direct-access route, which is based on stored full-form representations for morphologically complex words. Different proposals have been made as to how these two access routes interact. For example, according to Caramazza and collaborators, full-form-based lexical access is preferred for all known words, and the parsing route is only employed for novel or extremely rare

words that are morphologically regular (Chialant and Caramazza, 1995). In contrast, according to the morphological race model proposed by Baayen, Schreuder and collaborators, both the parsing route and the direct route operate in parallel. Which of these two routes turns out to be more efficient is claimed to depend on a number of factors, including the frequency of an inflected word and its constituents, the lexical neighborhood, the phonological and semantic transparency (vs. opacity) of a morphologically complex word, and the degree of homonymy of an affix (see, e.g., Baayen *et al.*, 2003; Bertram *et al.*, 2000). Much of the empirical evidence in the context of dual-route models comes from just one experimental task, namely so-called lexical decision, in which subjects have to discriminate between existing words (which have been encountered before) and nonce words (that have never been encountered before), e.g., *houses* vs. *nouses*. Lexical decision is a rather odd task, and it is hard to tell what response times to this task actually mean; see Balota (1994) and Deutsch and Müller (1999) for discussion. It seems clear, however, that given the task demands, lexical decision encourages subjects to strongly rely on memory, in order to determine whether or not they have encountered a stimulus word before. Thus, it could be that results from lexical decision have led us to overestimating the role of full-form access (as opposed to morphological parsing) in recognizing inflected and derived words.

Another variant of dual-mechanism morphology is the *words-and-rules* model of Pinker and collaborators (see, e.g., Pinker, 1999, Pinker and Ullman, 2002). The basic claim of the words-and-rules account is that two complementary systems coexist in how our mind/brain processes and learns language: a combinatorial (rule-based) system that generalizes over symbolic categories such as N(oun), V(erb), etc. and treats all members of a given category equally, and an associative system that extracts probabilistic contingencies such as frequency distributions, similarity clusters from the input data. These two systems can be implemented as neural circuits or subroutines that do not just underlie linguistic generalization, but are claimed to be used in other domains of cognition as well, for learning, and comparing in general. The key property of the combinatorial system is that it suppresses differences between individual examples and treats all members of a group or class equally. In contrast, the associative system generalizes on the basis of resemblance to stored examples. Extending Pinker's model, Ullman (2001) has argued that the distinction between words and rules can be linked to two different brain memory systems, according to which the associative system (words) depends upon

declarative memory and is rooted in temporal lobe structures of the brain, whereas the combinatorial system (rules) is rooted in frontal brain structures. However, the evidence currently available for such a strong localist interpretation of the words-and-rules distinction has not yet convinced everybody.

Much of the empirical research on the words-and-rules model comes from the study of a rather simple inflectional system, the English past tense. Pinker argues that the two different systems of his model directly correspond to the linguistic distinction between regular and irregular past tense formation. Regular *-ed* inflection is predictable in form, readily applies to novel items, and invokes a combinatory rule (add *-ed*) that may operate on the outputs of other morphological processes (derivation, compounding). On the other hand, irregular past tense inflection (e.g., *sing-sang*) is based on stored forms that cannot be perfectly predicted by the form of the stem or root, and only tentatively extends to new forms. There is indeed a considerable body of psycholinguistic evidence for the distinctions posited by the words-and-rules model from studies of the English past tense, investigating child language acquisition (Marcus *et al.*, 1992), adult language processing (Alegre and Gordon, 1999), brain-imaging and event-related potentials (Jaeger *et al.*, 1996; Münte *et al.*, 1999), and language disorders (Marslen-Wilson and Tyler, 1997; Clahsen *et al.*, 2004).

However, despite all the evidence that has been accumulated on the English past tense, there are many reasons to extend research on dual-mechanism morphology to a wider range of languages. Note, for example, that the English past tense has only one productive form (*-ed*) and that regularity is confounded with both the presence of an overt affix and with type frequency. Regular verbs in English are much more frequent (95%) than irregular ones (5%); see Marcus *et al.* (1995), and regular past tense forms contain a segmentable affix, whereas irregular forms typically do not have affixes. These two confounding features leave room for several alternative interpretations of the same set of facts. Potential differences, for example, between forms such as *walk-ed* and *came* in acquisition and processing could be effects of frequency differences and/or effects of the presence or absence of an overt affix, rather than the result of different mental representations.

To address these concerns, psycholinguistic studies have examined a range of typologically different languages from the perspective of dual-mechanism morphology: German: Clahsen (1999); Hebrew: Berent *et al.* (1999); Italian: Say and Clahsen (2002); Spanish: Clahsen *et al.* (2002a), Rodriguez-Fornells *et al.* (2002); Catalan: Rodriguez-Fornells

et al. (2001). These studies focus on the question of whether and how the fundamental distinction between lexical storage and combinatory rules extends to linguistic systems other than the English past tense (see Pinker 1999, Chap. 8 for review). The results of these studies revealed contrasts that were similar to those obtained for regular and irregular inflection in English even though the vocabulary distribution, the surface morphology, and other properties of the language were different from those of English past tense formation. For example, psycholinguistic examination of the German noun plural system revealed that even though the *-s* plural is the least frequent plural allomorph in German, it exhibits the same experimental effects as the regular past tense *-ed* in English (Marcus *et al.*, 1995). The same is true for past participle formation in German although, unlike English, German has two segmentable participle endings, the regular *-t* and the irregular *-n*, and the vocabulary distribution for regulars and irregulars is different from that of the English past tense (Clahsen, 1999). Priming experiments revealed regular/irregular differences for German participles even though the phonological and orthographical distance between the participle forms and their corresponding stem forms tested was identical for both regular and irregular verbs (Sonnenstuhl *et al.*, 1999). For example, an irregular participle such as *geschlafen* 'slept' is as similar to its base form (*schlaf*) as a regular participle (e.g., *geöffnet* 'opened') is to its base stem (*öffn-*), and despite these formal similarities, the regular form produced full priming and the irregular one did not, exactly as in corresponding experiments on the English past tense (Stanners *et al.*, 1979). These results show not only that the words-and-rules model extends to morphological systems other than the English past tense, but also that alternative nonmorphological factors (e.g., the frequency distribution and the surface properties of inflected word forms) that may hold for the English past tense cannot explain the observed contrasts between lexically based (frozen) and rule-based (built) inflected word forms.

Dual-mechanism morphology can be implemented into an explicit linguistic theory in different ways. One direct implementation is Wunderlich and colleagues' morpheme-based model (Wunderlich, 1996) according to which irregularly inflected forms are lexically represented as subnodes of structured lexical entries, while regular inflection involves combinatorial rules that concatenate an affix with a lexical entry. An alternative implementation within realization-based models of morphology reconstructs this contrast in terms of the distinction between rules that contain variables and those that have a constant output; see, e.g., Blevins (2004). Irregular inflection,

for example, the form *is* of the verb *to be*, is encoded as a realization rule that has a constant formal spell-out (<[V, 3sg, pres, ind, BE], is>), whereas combinatorial (regular) inflection such as the regular 3sg present tense *-s* in English is based on a realization rule (<[V, 3sg, pres, ind], X + s>) that adds the exponent 's' to the base form represented by a variable (X) yielding inflected word forms for any verb that is not blocked by a more specific rule. Thus, although dual-mechanism morphology can be construed in terms of an opposition between rules and entries, the basic distinction between built and stored elements can also be expressed in alternative all-rules models of morphology.

From a linguistic perspective, dual-mechanism morphology and the accompanying empirical studies suggest that structural differences between built and frozen forms correspond to differences in the way they are mentally represented and processed by the speaker/hearer and acquired by children. This raises the question of whether there is any psycholinguistic evidence for more complex morphological concepts and operations that go beyond the simple opposition between built and frozen forms, a question that my colleagues and I have investigated in a number of recent studies using psycholinguistic experiments and other sources of evidence. We have studied, for example, the mental representation of stem allomorphy (Clahsen *et al.*, 2001a, 2002b), the role of inflectional paradigms in language processing and disorders (Clahsen *et al.*, 2001a, 2001b), and the effects of the split between derivation and inflection on morphological processing (Clahsen *et al.*, 2003). Even though further study is required to determine whether the results obtained generalize to other morphological systems, the findings from these studies suggest that morphological distinctions (beyond words-and-rules) do indeed play an important role in the organization of the mental lexicon and that morphological notions and concepts are not only useful descriptive tools for linguists, but also contribute to a better understanding of how the speaker/hearer processes morphologically complex words.

See also: Inflection and Derivation; Morphology in Parallel Distributed Processing; Psycholinguistic Research Methods; Psycholinguistics: Overview.

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Duan Yucai (1735–1815)

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Duan Yucai (also known as Duan Ruoying and Duan Maotang) is regarded as one of the most outstanding scholars in the study of Chinese philology in the Qing dynasty (1644–1911). He was a native of Jintan County in Jiangsu Province and grew up there. In 1763 he met the eminent scholar Dai Zhen (1725–1777) in Beijing and later became his disciple. Duan's development was deeply influenced by his teacher.

Duan's works on etymology and phonology have held dominant positions in their respective areas. His *Shuowen jiezi zhu* (*Annotation on the Shuowen jiezi*), a nearly thirty-year effort, inspired a golden era of study on the *Shuowen jiezi*. The *Shuowen jiezi*, compiled in the first century, is the earliest extant etymological dictionary of Chinese characters. While

numerous attempts had been made before Duan to amend the *Shuowen jiezi*, it was not until Duan's work that the *Shuowen jiezi* really was thoroughly and systematically analyzed. His lengthy annotation covered many areas, with the following contributions particularly worth mentioning: (1) by using evidence from the dictionary itself and other classical documents, a large number of original annotations and even old writings of characters in the *Shuowen jiezi* were corrected; (2) the meanings of various technical terms employed in the *Shuowen jiezi* were explained in detail; (3) the format of the entries in the *Shuowen jiezi* was explicated, which in turn enabled Duan himself to correct and amend the dictionary; (4) the original meaning, the derived meanings, and any phonetic loan uses of each character were discussed, and their semantic changes were well illustrated with reference to classical documents; (5) sets of cognate words were identified, paving the way to the modern study of Chinese word families. One of the many reasons why Duan succeeded in the annotation is