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ABBREVIATIONS AND SYMBOLS

A adjective; agent; argument
A any syntactic category (in A-binding, A-over-A Principle)
AA Afro-Asiatic; Austro-Asiatic
abbr. abbreviation
abl. ablative
abs. absolutive
acc. accusative
ACH Association for Computers and the Humanities
ACL Association for Computational Linguistics
act. active; actor
AD Alzheimer's dementia
adess. adessive
adj. adjective
ADJP adjective phrase
adv. adverb(ial)
ADVP adverbial phrase
AE Achaemenid Elamite
AGR agreement
agt. agent(ive)
AI Artificial Intelligence
ALLC Association for Literary and Linguistic Computing
AM Ancient Mongolian
AMR Allomorphic Morphological Rule
AN Austronesian
an. animate
aor. aorist
AP adjective phrase
APG Arc Pair Grammar
API Association Phonétique Internationale
A-position argument position
AR Arumanian
Ar. Arabic
Arm. Armenian
ART article
ASL American Sign Language
ASP aspect
ASR Automatic Speech Recognition
ATN Augmented Transition Network
ATR advanced tongue root
AUX auxiliary
Av. Avestan
BCE Before Common Era (= B.C.)
BEAM Brain Electrical Activity Mapping
BI Bahasa Indonesia
BM Bahasa Melayu; Bokmål
BP bound pronoun; Brazilian Portuguese
BS Balto-Slavic
BVC bound verb complement
C complement; complementizer; consonant
c. century
CA Classical Arabic; Componential Analysis; Contrastive Analysis; Conversational Analysis
ca. *circa*, approximately
CAP Control Agreement Principle
CAT Computerized Axial Tomography
caus. causative
c-command constituent command
CD Communicative Dynamism; Conceptual Dependency
CE Common Era (= A.D.)
CED Condition on Extraction Domain
CF Context-Free
CFG Context-Free Grammar
CFL Context-Free Language
Ch.Sl. Church Slavic
CHO chômeur (in Relational Grammar)
CL Classical Latin; compensatory lengthening
clf. classifier
col. column
COMP complementizer
comp. comparative; complement
conj. conjunction; conjunctive
cont. continuative
cop. copula
CP Complementizer Phrase; Cooperative Principle
CR Comparative Reconstruction
CS Context-Sensitive
CSR Contemporary Standard Russian
c-structure constituent structure
CV cardinal vowel; consonant-vowel (syllable structure)
D dative; derivational; determiner; diacritic feature; dictionary
d. died
Da. Danish
DA Discourse Analysis
DAF delayed auditory feedback
dat. dative
dat.-acc. dative-accusative
DCG Definite-Clause Grammar
DD developmental dysphasia
decl. declension
def. definite
dem. demonstrative
deriv. derivative
desid. desiderative
DET determiner
dim. diminutive
dir. direction(al)
DM discourse marker
DO direct object
DP Determiner Phrase
DR Daco-Rumanian; discourse representation
DRS Discourse Representation Structure
DS marking Different Subject marking
D-structure an alternative conception to 'deep structure'
DTC Derivational Theory of Complexity
DTW Dynamic Time Warping
du. dual
DV dynamic verb
e empty category
E externalized
EA Eskimo-Aleut
ECP Empty Category Principle
emph. emphatic

encl. enclitic
Eng. English
ENHG Early New High German
EP European Portuguese
EQUI Equi-NP Deletion
erg. ergative
EST Extended Standard Theory
ex. example
exx. examples
F fall; formant
f. feminine; and following
F-R fall-rise
f-structure functional structure
$\mathbf{F_0}$ fundamental frequency
Fa. Faliscan
fact. factive
FCR Feature Cooccurrence Restriction
fem. feminine
ff. and following (plural)
fig. figure
fl. *floruit*, flourished, lived
FLRP Fixed Language Recognition Problem
FN first name
foc. focus
Fr. French
FSD Feature Specification Default
FSP Functional Sentence Perspective
fut. future
G gender; glide
Gael. Gaelic
GB Government/Binding
G/D genitive/dative
gen. genitive
Ger. German
ger. gerund
Gk. Greek
Gmc. Germanic
Go. Gothic
GPC grapheme-phoneme conversion
GPSG Generalized Phrase-Structure Grammar
GR Grammatical Relation
GS Generative Semantics
Guj. Gujarati
H hearer; high; hold (ASL)
habit. habitual
Hitt. Hittite
HM Hmong-Mien
hon. honorific
HPSG Head-driven Phrase-Structure Grammar
HR high rise
Hz Hertz (cycles per second)
I inflection; internalized
IA Indo-Aryan; Item-and-Arrangement
IC Immediate Constituent; Inherent Complement
ICA Initial Consonant Alternation
ICM Idealized Cognitive Model
ID Immediate Dominance
IE Indo-European
iff if and only if
IG intonation group
II Indo-Iranian
IL Intensional Logic
ill. illative
imper. imperative
impers. impersonal
impf. imperfect(ive)
inan. inanimate
incl. including, inclusive
ind. independent
indef. indefinite
indic. indicative
inf. infinitive
INFL inflection
inst. instrumental
interj. interjection
intrans. intransitive
invol. involuntary
IO indirect object
IP Inflection Phrase; Item-and-Process
IPA International Phonetic Association or Alphabet
IR Internal Reconstruction
Ir. Iranian
irreg. irregular
IS Interactional Sociolinguistics
Ital. Italian
KA Krama Andhap (= Middle Javanese)
KI Krama Inggil (= High Javanese)
L language; location (ASL); low
L1 first language
L2 second language
LA Latin America; linguistic area
La. Latin; Latvian
LAD Language Acquisition Device
LBH Late Biblical Hebrew
LF Lexical Function; Logical Form
LFG Lexical-Functional Grammar
LH left hemisphere
Lh. Lhasa
Li. Lithuanian
LIC lower incisor cavity
LIPOC language-independent preferred order of constituents
lit. literally
Lith. Lithuanian
LM Literary Mongolian
l-marking marking a lexical category
LN last name
loc. locative
LP Language Planning; Linear Precedence
LPC Linear Prediction Coefficient
LR low rise
LSA Linguistic Society of America
LSP Language for Specific Purposes
LU lexical unit
Lyc. Lycian
M mid; movement (in ASL); modal; mot (in Metrical Phonology)
m. masculine
MA Meso-American
masc. masculine
m-command maximal command
MCS Mildly Context-Sensitive
MDP Minimal Distance Principle
ME Middle English
MG Montague Grammar
MH Middle/Mishnaic Hebrew
MHG Middle High German
MIA Middle Indo-Aryan
mid. middle
MIT Massachusetts Institute of Technology
MK Mon-Khmer
MLU mean length of utterance
MM Middle Mongolian
Mod. modern
Mod.E. Modern English
MOP Maximal Onset Principle
MP Malayo-Polynesian; Middle Persian
MPR Mongolian People's Republic; morphophonological rule
ms millisecond
ms. manuscript
MSA Modern Standard Arabic
MSC Morpheme Structure Constraint
MSK Modern Standard Khmer
mss. manuscripts
MST Modern Standard Telugu
MT Machine Translation
N noun; number
n. note
NA North America; Northern Athabaskan
N/A nominative/accusative
NC Niger-Congo
NCC North Central Caucasian
n.d. no date
NE New English (= Modern English)
neg. negative
neut. neuter
Ng. Ngoko (= colloquial Javanese)
NGP Natural Generative Phonology
NHG New High German
NIA New Indo-Aryan
NL natural language
NLI Natural Language Interface
NLP Natural Language Processing
NM Natural Morphology
NN Nynorsk
No. Norwegian
nom. nominative

NOM nominal(ization)
nonfin. non-finite
NP New Persian; noun phrase
NS Nilo-Saharan
n.s. new series
NWC Northwest Caucasian
O object
obj. object
obl. oblique
obs. obsolete
OCS Old Church Slavic
OE Old English
OG Old Georgian
OHG Old High German
OI Old Iranian
OIA Old Indo-Aryan
OK Old Khmer
OM object marker
ON Old Norse
OP Old Persian; Old Portuguese; Old Prussian
OP null operator
OPer. Old Persian
opt. optative
ORuss. Old Russian
Os. Oscan
o.s. old series
P person; patient; phrase; predicator; preposition; position (in ASL)
PA Proto-Australian
PAE Proto-Athabaskan-Eyak
PAN Proto-Austronesian
PAn. Proto-Anatolian
PAS Preferred Argument Structure
pass. passive
pat. patient
PC pronominal clitic
PCA Pacific Coast Athabaskan
PCF Phonetically Consistent Form
pcl. particle
pcpl. participle
PCU Preferred Clause Unit
PD Proto-Dravidian
PDP Parallel Distributed Processing
Per. Persian
perf. perfect(ive)
pers. person
PET Positron Emission Tomography
PF Phonetic Form
pf. perfect(ive)
PGmc. Proto-Germanic
Phryg. Phrygian
PIE Proto-Indo-European
Pkt. Prakrit
pl. plural
PLD Primary Linguistic Data
PLu. Proto-Luvian
plupf. pluperfect
PM phrase-marker; Proto-Mayan
PN predicate nominal
PNC Proto-Niger-Congo
PNI Proto-Northern Iroquoian
POc. Proto-Oceanic
Pol. Polish
pol. polite
poss. possessive
postpos. postposition
PP prepositional phrase
PR Phonological Representation; Phonological Rule
PRED predicate
pref. prefix
prep. preposition
pres. present
prev. preverb
PRO pronoun, pronominal
prog. progressive
pron. pronoun
prt. particle
P-rule phonological rule
PS Phrase Structure; Preference Semantics
PSG Phrase-Structure Grammar
PST Proto-Sino-Tibetan
PT patient-trigger; Proto-Tai
PTB Proto-Tibeto-Burman
Q quantifier; question
QH Qumranic Hebrew
q.v. *quod vide*, which see
qq.v. *quae vide*, which see (plural)
R root
RC relative clause
RE Recursively Enumerable
real. realis
redup. reduplication
refl. reflexive
rel. relative
rem. remote
repr. reprinted
REST Revised Extended Standard Theory
rev. revised
R-expression referring expression
RG Relational Grammar
RH right hemisphere
RN Relational Network
RP Recognition Problem; Received Pronunciation; referential pronoun
RR Readjustment Rule
R-rule Redundancy Rule
RT reading tradition
RTN Recursive Transition Network
Ru. Russian
S sentence; speaker; subject
SA stem augment
SAAD simple active affirmative declarative (sentence)
SBH Standard Biblical Hebrew
SC small clause; South Caucasian; Structural Change
Sc. Scandinavian
SCC Strict Cycle Condition
SD South Dravidian; Structural Description
SEA Southeast Asia(n)
sec. secondary; section
ser. series
SFH Semantic Feature Hypothesis
SG Stratificational Grammar; Standard Gujarati
sg. singular
SGML Standard Generalized Markup Language
SH Standard Hausa
SHWNG South Halmahera—West New Guinea.
Skt. Sanskrit
Sl. Slavic
SM series marker
soc. sociative
SP Semantic Parsing; subject pronoun
Sp. Spanish
SPE *The Sound Pattern of English*
SS marking Same Subject marking
S-structure shallow structure
ST Sino-Tibetan
stat. stative
sub. subordinator
SUBCAT subcategorization
subj. subject
subjunc. subjunctive
subord. subordinate, subordinative
subst. substantive
superess. superessive
SUR Speech Understanding Research
SV stative verb
Sw. Swedish
SWITCH switch reference
syn. synonym, synonymous
Syr. Syriac
t trace
T title; *tu* (familiar address)
TAP tense-aspect pronoun (Hausa)
TB Tibeto-Burman
TBU Tone-Bearing Unit
TG Transformational Grammar; Tupí-Guaraní
Tib. Tibetan
TK Tai-Kadai
Toch. Tocharian
TOP topic
tr. transitive
trans. transitive
trig. trigger
T-rule transformational rule
TV transitive verb
U utterance

UA Uto-Aztecan
UC ultimate constituent
UG Universal Grammar
Ukr. Ukrainian
Um. Umbrian
URP Universal Recognition Problem
V verb; vowel; *vous* (polite address)
Ved. Vedic (Sanskrit)
ver. version
VH vowel harmony
VL Vulgar Latin
voc. vocative
vol. volume
VOT voice-onset time
VP verb phrase
W word
WFR Word-Formation Rule
WH Western Hausa
WH-word question-word (*what*, etc.)
W* language non-configurational language
WMP Western Malayo-Polynesian
WP Word-and-Paradigm
WT Western Tibetan
X any syntactic category (in X-Bar Theory)
∅ zero (covert element)
1 first person; subject (Relational Grammar)
2 second person; direct object (Relational Grammar)
3 third person; indirect object (Relational Grammar)
* non-attested form (hypothetical or reconstructed); Kleene star
< comes from
> becomes
→ is rewritten as (phrase structure rule)
⇒ is transformed into
α alpha, a variable
Δ delta, a dummy element in syntax
θ theta, thematic (role)
σ sentence; syllable
Σ sentence; stress

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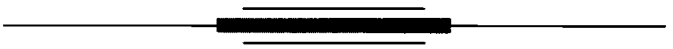

M

CONTINUED

MORPHEME. In some treatments of MORPHOLOGY [*q.v.*], words are analyzed into basic units called morphemes, and the process is called MORPHEMICS. Thus *blackening* contains three morphemes: one identified by *black*, another by *-en*, and a third by *-ing*. Morphemes are the basic units of syntax, and have no internal structure. But they are realized as sequences of phonemes: the 'black' morpheme as /blæk/, etc. These sequences are MORPHS and, for a given morpheme, they may vary with the context. For example, a morpheme 'plural' is realized as /s/ in *cats*, as /z/ in *dogs*, as /ən/ in *oxen*, etc. These variants are ALLOMORPHS, and the morpheme itself may be defined as a set of allomorphs which are grammatically equivalent.

This approach was developed in the 1940s (see Harris 1951 and Hockett 1958), within the framework of American structuralism. In previous work by Bloomfield 1933, the morpheme was the formal unit which was itself composed of phonemes; a unit of meaning, the sememe, was directly associated with it. Thus *cats* had a morpheme /s/, and *oxen* had a different morpheme /ən/; however, the same meaning, 'more than one', was associated with both. But Harris in particular wanted to establish units by distributional criteria, without reference to meaning. It was therefore necessary to unite all variants at the formal level.

Harris's procedures were criticized by scholars outside the American school, most effectively by Haas 1954. There were also many internal problems. *Mice*, for example, is plural; i.e., it must have the 'plural' morpheme. But where is its allomorph? No satisfying answer was found; and by the 1960s it was clear that the model in its strict form distorted the morphology of many languages. But the concept of the morpheme as a syntactic unit had been taken over into generative grammar, and has remained influential.

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MORPHEME-STRUCTURE CONSTRAINTS. In the phonological component of a generative grammar, M[orpheme-]S[tructure] C[onstraint]s express restrictions on the phonological shape of linguistic forms as they appear in the lexicon—e.g. the obligatory agreement in place of articulation in English morpheme-internal nasal + stop clusters *(tempest, limbo, lentil, candy, junco, finger)*.

In early Generative Phonology [*q.v.*] (Halle 1959), MSCs were conceived of as rules which (i) applied before lexical insertion, and (ii) operated in a purely feature-filling mode. [*See* Markedness, *article on* Markedness in Phonology.] They differed from ordinary feature-changing phonological rules in both respects. Later work revealed problems in regard both to the rule status of MSCs and to their feature-filling function; it was proposed that morpheme structure rules be replaced by static conditions defined over fully specified lexical entries (Stanley 1967). This move necessitated complications in the evaluation metric; and it contributed to the problem that many MSCs duplicate phonological rules in their effects, but are formally unrelated to them (Kenstowicz & Kisseberth 1977). Nasal Assimilation in English is a case in point: besides being a MSC, it is also a phonological rule which operates across morpheme boundaries *(en-able, em-bark, e*[ŋ]*-capsule)*. The problem of duplication was exacerbated by attempts to

limit the degree of abstractness (Kiparsky 1968) in underlying phonological representations by disallowing morpheme-internal applications of phonological rules. Further problems related to MSCs concern their domain of application, and the derivational level of their enforcement. Certain cases have been argued to require a more inclusive domain, like the 'word', instead of the 'morpheme'; and it has been proposed that at least some constraints hold at the level of surface structure, rather than underlyingly (Shibatani 1973).

A new approach to MSCs emerges in the framework of Lexical Phonology [*q.v.*] (Kiparsky 1982). The hypothesis that underlying representations are underspecified makes it possible to view MSCs not as independent entities, but rather as a mode of operation (viz. feature-filling) of lexical phonological rules. In this way, the same rules that apply in a feature-filling manner to non-derived forms—where they determine the shape of basic lexical entries, and thus express morpheme structure regularities—continue to apply in a feature-changing manner in derived environments, where they affect the structure of derived lexical forms. This is termed STRUCTURE PRESERVATION.

As prosodic constituent structure, in particular that of SYLLABLES [*q.v.*], came to be recognized as a central component of phonological representations, it became evident that many proposed constraints on morpheme structure are, in fact, constraints on syllable structure. This holds for the English sequential constraint which allows the initial sequences *br* and *bl*, while disallowing *bn*. Beyond syllabification, constituents like syllables and FEET [*see* Metrical Phonology] play an important role in defining prosodic size requirements on elements of certain lexical classes (McCarthy & Prince 1990). For example, in many Australian languages, every prosodic word minimally consists of one metrical foot.

Developments within Autosegmental Phonology [*q.v.*] have led to a deeper understanding of MSCs which restrict the morpheme-internal co-occurrence of certain features, and which result in patterns of morpheme-internal harmony and disharmony. Examples include:

(a) Dissimilation in point of articulation, e.g. the homorganicity constraint on root shape in Semitic languages, where a sequence like **fmt* is impossible as a consonantal root because it contains two labial consonants
(b) Dissimilation in laryngeal features such as aspiration (Grassmann's Law in Sanskrit and Greek) and voicing (Lyman's Law in Japanese, which disallows the occurrence of more than one voiced obstruent per morpheme, thus ruling out forms like **dago*)

It has been argued (McCarthy 1986, Mester 1986) that such restrictions are reducible to the OBLIGATORY CONTOUR PRINCIPLE, which disallows adjacent identical elements on an autosegmental tier.

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MORPHOLOGY. [*This entry is concerned with the inflectional and derivational composition of words, typically in terms of roots, stems, and affixes—as opposed to syntax, understood as the way that words are combined into sentences. It comprises four articles:*

An Overview
Morphological Typology
Morphology and Phonology
Morphology and Syntax

For types of units involved in morphological description, see Affixation; Clitics; Derivational Morphology; Inflection; Stem and Root; *and* Words. *For further discussion of theoretical approaches to morphology, see also* Generative Morphology; Morpheme; Morphophonemics; Natural Morphology; *and* Word-and-Paradigm Model.]

An Overview

Morphology is, in brief, either the grammatical study of word structure, or the corresponding part of language study. Thus it is a central part of grammar—according to many linguists, the most central part. The term is an originally German creation *(Morphologie)* from Greek *morphḗ* 'form'. Traditionally, morphology comprises both the study of the grammatical forms a word may take—INFLECTION [*q.v.*], as in Eng. *form, form-s*—and WORD FORMATION, i.e. the grammatical relations between words of the same family, in terms of either DERIVATIONAL MORPHOLOGY [*q.v.*], as in *form-ation, form-al,* or COMPOUNDING [*q.v.*], as in *cunei-form, word form.* The precise content and format of morphology are, however, matters of much dispute (cf. Bauer 1988, Hammond & Noonan 1988, Beard & Szymanek 1988).

In 19th-century historical and comparative linguistics, morphology was the most basic concern, because the comparison of morphological subsystems such as numerals and verb inflection was essential in establishing genetic relationships among languages and diachronic 'sound laws'. Inflectional morphology has been even more fundamental for typological research, particularly the postulation of language types. [*See article on* Morphological Typology *below.*]

Structural linguistics, starting with Ferdinand de Saussure, considered either the MORPHEME or the WORD as the basic unit of morphology. [*See* Morpheme; Word-and-Paradigm Model.] In the latter case, the grammatical meanings of an inflectional word form are considered to be signaled by formal exponents, e.g., the grammatical meaning 'past participle' in *spoken* by the exponents of vowel modification (ablaut) and suffixation. If lexical and grammatical morphemes are taken as primary units, morphological structure is understood as a concatenation of morphemes whose content and form may vary according to their environment (allomorphy); thus *-en* in *oxen* is an allomorph of /z/ (as in *boy-s*), and both are morphs (or formatives or exponents) of the plural morpheme. Similarly, the meaning of the plural *heaven-s* is an alloseme of the usual plural meaning. (Sememes and semes are the meanings of morphemes and morphs.) If morphemes are the minimal recurrent form/meaning units, then they must not have internal morphological structure. Sometimes, however, one part of a morpheme (but not the rest) may be identified as having recurrent form and meaning, such as *gl-* in *glitter, glare, glow,* etc., or *th-* in *the, this, thus,* etc.; such elements have been called SUBMORPHEMES (cf. Blust 1988, Rhodes & Lawler 1981). [*See* Sound Symbolism.]

The advent of Generative Grammar has brought rule/process-oriented approaches to the forefront; see Corbin 1987. [*See also* Generative Morphology; Natural Morphology.] Of note also are 'postgenerative' approaches such as those of Bybee 1985, Carstairs 1987, and Ford & Singh 1985. Again, if grammatical morphemes are located in the lexicon as are words, rules concatenate them as in compounding; if they are not, they must be generated by rules applying to their bases—to words such as *boy* in *boy-s, boy-ish,* or to STEMS and ROOTS such as *aud-* in *audible.* [*See* Stem and Root.] Only in process/rule models do we find problems of rule application, e.g. the order and interaction of rules. [*See* Lexical Phonology; Adjacency.] Both REDUPLICATION [*q.v.*]-and non-concatenative operations such as modification (e.g. ablaut) or CONVERSION [*q.v.*] are more amenable to a process approach than to a static morphemic approach. This holds also for subtractive rules, as in German dialectal *hond* 'dog', pl. *hon*; but ABBREVIATION [*q.v.*] is generally considered not to be a type of morphological rule. SUPPLETION [*q.v.*] is still more irregular in its formal (morphotactical) relations.

Usually form and meaning are treated together—despite the structuralist distinction between morphotactics for the first, and morphosemantics for the second. However, Beard 1986 (cf. Szymanek 1988) proposes a strict separation between semantic derivation rules and formal operations, at least for word formation. The distinction of a third area of morphological inquiry, MORPHOPRAGMATICS—i.e. the pragmatics of morphological rules, not of lexical items—is put forward by Dressler & Merlini 1987. [*See* Diminutives.]

In word formation, morphological and lexical information interact in accounting for both semantic and pragmatic meaning. Take the example of the Eng. compound *chairwoman.* Morphosemantics informs us that *woman* is the semantic HEAD of the compound; i.e., it means a woman who is in some typical relation to a chair. [*Cf.* Heads; Inheritance.] Morphopragmatics informs us, first, that such *woman* compounds generally contrast with respective *man* compounds, but may designate only females, while the respective *man* compounds may potentially designate both males and females; and second, that *woman* compounds are less likely to have derogatory reference than derivations with *-ette* (e.g. *cop-ette, chauffeur-ette*). Lexical semantics gives us the exact, particularly denotational meaning of

chairwoman. Lexical pragmatics deals with its specific (idiosyncratic) pragmatic usages in relation to *chairman*. Thus the meaning of word formation can be distinguished from the lexical meaning of words.

In accordance with this distinction, many morphologists (particularly those working in generative and Natural Morphology models) think that morphology should concentrate on regular and productive rules of word formation (e.g. Aronoff 1976), and leave lexical idiosyncrasies to lexicology. In this way morphology may be restricted to the study of morphological motivation—how the form and meaning of words and inflectional word forms are motivated by morphological operations, particularly rules, and by their lexical bases.

Inflection is usually more productive and regular than word formation; this is one of the many gradual distinctions between inflectional and derivational morphology. Thus there is relatively little clash between the syntactic and morphological meanings of inflectional word forms. A number of criteria, generally non-discrete and thus debatable, have been proposed to distinguish inflection from word formation (cf. Plank 1981, Anderson 1982, Scalise 1984, Bybee 1985, Dressler et al. 1987, Dressler 1989). Two of these refer to the domain of morphology as a whole:

(a) Inflectional morphology, at least marginally, comprises morphologically non-complex grammatical words which are in suppletive relation to each other, such as Eng. *I, me, we, us*; however, relations like those between *ox* and *cow, sea* and *maritime* clearly belong to the lexicon, and not to word formation. (An exception may be the suppletion between *two* and *second*, by analogy with *four* and *four-th*, etc.)
(b) Some morphologists enlarge the domain of inflectional morphology to the phrase, and treat clitic pronouns, as in French *je te vois* 'I see you', as phrasal affixes (cf. Anderson 1988). [*See* Clitics.] However, no clear phrasal correspondent to derivational morphology has yet been found.

Another type of transition between morphology and phrasal syntax is the juxtaposition: a lexicalized multilexical unit which easily passes over to loose compounds, e.g. German *Hohes Haus* 'Upper House' vs. compound *Hoch-haus* 'highrise, skyscraper'. Still another is the phrasal verb such as *drop in, drop out, look on* vs. the nominal derivations *drop-in, dropp-er-in, on-look-er* (cf. Bauer 1983:288).

The lower boundary of morphology falls on the interface between phonology and morphology. Thus the change of the final consonant of *wife* in its plural *wive-s* can be treated either morphologically or phonologically, or in both ways; hence terms such as MORPHOPHONOLOGY are used for this area of interaction. [*See article on* Morphology and Phonology *below*.]

Among the various linguistic schools, morphology has been, along with phonology, of central concern in classical structuralist models and in Natural Morphology. In models which first concentrated on syntax, profound and detailed morphological studies have generally been late and rare, e.g. in Montague Grammar (cf. Dowty 1979), Categorial Grammar (cf. Hoeksema 1984), and Functional Grammar (cf. Dik 1985). This was also true for generative grammar in the 1960s; but the 1970s and 1980s have brought a rising concern and sophistication to the study of morphology (cf. Hammond & Noonan 1988, Beard & Szymanek 1988; see also the journal *Linguistics*, vol. 26, no. 4 [1988], and *Morphology Yearbook* vol. 1 [1988].) [*See* Generative Morphology; Lexical Phonology.]

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Morphological Typology

As opposed to other levels in the study of language—phonology, syntax, and lexicon—morphology is the domain of maximum differentiation. This is why linguistic typology, as a principled way of classifying the languages of the world by the most significant properties which distinguish one from another, has long been essentially morphological. Obviously, the search for language universals is closely related to typology: the most fundamental properties, shared by all languages, coexist with type-specific properties, which are the scope of typology (see Hagège 1982). However, this search will not lead to many substantive findings if applied to morphology. This is because the WORD, as the main unit dealt with by morphology, is subject, as regards its formal structure, to a great deal of variation across languages. [*See* Words.]

Thus many specialists of the late 1980s still use the morphological typology of the German school of comparative linguistics (A. W. Schlegel 1818, F. Schlegel 1808, Humboldt 1836–39, and Schleicher 1861). This typology divides the languages of the world into three main types, depending on whether units are autonomous—the ISOLATING type—or associated with affixes. With blending at the boundaries and variations in form, we have the INFLECTING type; otherwise, the AGGLUTINATING type (see Hagège 1990).

Morphological typology has played an important role in the elaboration of theoretical models in modern linguistics. Researchers trained in the classical Chomskyan paradigm have pointed to the existence of morpheme structure conditions (see Anderson 1974) in various types of languages. However, authors following the paradigm of Natural Morphology [*q.v.*] have proposed certain generalizations about language types, intermediate between universal naturalness and language-specific normality (see Dressler 1985).

Unlike genetic reconstruction, morphological typology is normally synchronic. Furthermore, given the choice of word structure as its main criterion, it should have no recourse to arguments taken from sentence structure and grammatical functions. However, this is an unattained ideal: despite its purported aim, morphological typology, as it has been and still is practised, is neither strictly synchronic nor strictly morphological. The reason is not far to seek. In many languages, the structure of complex words cannot be explained without taking historical facts into account. For example, the *-hood* of Eng. *brotherhood* is the reduced form of an Old English noun. Again, the group *adduce, produce,* and *reduce* suggests a stem *-duce,* which does not exist formally and is not easy to characterize semantically, unless one takes into consideration the Latin component of English morphology. The status of such a component is ill-defined, as is the boundary between diachrony proper and etymology. [*See* Historical Linguistics.]

In some languages it is not possible to account for the structure of certain words without syntactic arguments, which involve elements located outside these words and handled in the framework of sentence structure. For example, in a Slavic language like Sorbian, the only way to explain the genitive singular of the possessive adjective *mojeho* in *mojeho bratrowe dźěći* 'the children of my brother' is to consider that it is controlled by the

noun *bratr* in the genitive *bratra*—which, although it does not appear, must be deduced from the adjective *bratrowe*, used here in the nominal plural like the noun *dźěći*, the controller of agreement. Comparable facts have been mentioned in Eskimo (see Sadock 1980).

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Morphology and Phonology

The interface between phonology and morphology lies in the area covered by the terms MORPHOPHONEMICS and MORPHOPHONOLOGY or MORPHONOLOGY. These terms have been used in a variety of ways. The uses all recognize a level of language or analysis of language which differs from pure phonology in that it involves lexical and grammatical information mixed with phonological information.

Of modern schools of phonology, only the generative phonology represented by Chomsky & Halle 1968 has entirely denied the significance of the distinction between pure phonology and morphophonology. Different schools, however, have drawn the boundary in slightly different places. We can illustrate this with concrete examples. (It is helpful to remember that the term 'morphophonemic' may be used differently to describe levels of representation and rules.)

1. Types of data. The Russian verb *otbivat'* 'to beat back' is pronounced /adb'ivát'/. The change of *t* to *d* before *b* is the result of a fully automatic regressive assimilation of voice in obstruent clusters. (There is also an automatic change of unstressed *o* to /a/.) This change is treated as phonological by all modern theories. Trubetzkoy 1934 would call it a neutralization, while Jakobson 1948 called it an 'automatic alternation'; but both treat it as phonological. The American descriptivists, however, would label this alternation morphophonemic, because it involves a level more abstract than that of phonemics.

The representation //otb'ivat'// is more widely labeled morphophonemic. This is because, to identify the first two segments as *ot*, we must parse the word and recognize a prefix *ot-* added to a verb *b'ivat'*. This process is clearly morphological. Only the Moscow Phonological School (cf. Avanesov & Sidorov 1970) would call this level of representation 'phonemic': they define phonemics as the level from which you can get to phonetics by the application of purely phonological rules.

The Russian noun *drug* 'friend' has a diminutive *družok*, genitive *družka*. The change of *g* to *ž* (velar palatalization) before the diminutive suffix *-(o)k* is morphologically regular, but it has nothing to do with phonological environment: it is triggered by the suffix. The vowel/zero alternation in *-(o)k* is equally non-phonological. These two alternations were labeled 'morphophonemic' by Jakobson, and are called 'morphonological' by most European linguists.

M[ORPHO]P[HONOLOGICAL] R[ULE]s can be defined as rules with lexical or grammatical conditioning. For those who recognize the distinction between MPRs and P[HONOLOGICAL] R[ULE]s, the only grammatical conditioning allowable for PRs is boundaries. The adherents of Natural Phonology [*q.v.*] (e.g. Hooper 1976) do not allow even boundaries as positive conditioning factors.

An example of extreme lexical conditioning is found in English plurals of the type *wife, wives*. This also involves grammatical conditioning, since it is specifically the plural morpheme which conditions the change of *f* to *v*. A common example of grammatical conditioning is the umlaut (vowel fronting) in the plural of German nouns, e.g. *Vogel* 'bird', pl. *Vögel*.

It is this mixture of lexical and grammatical conditioning which justifies the 'morpho-' in 'morphopho-

nology'. The '-phonology' is also justified, even for the rules mentioned above: the velar palatalization applies specifically to velars, and umlaut applies specifically to back vowels. Kiparsky 1968 has shown that in German dialects, when new back vowels are created, there is a tendency to umlaut them, and to adjust the output of umlaut so that there is a simple back/front relationship between the vowels. Other examples of phonological regularization are found in Darden 1979.

Among the theoretical issues relevant to morphophonology are (i) the relevance of the distinctions among phonology, morphophonology, and morphology; and (ii) the nature of morphophonological rules and representations. These are discussed below.

2. Distinctions. It is very difficult to justify a separation of phonologically automatic processes from the allophonic processes which everyone accepts as 'pure' phonology. A single process may have both functions. This is true of voicing assimilation in Russian, which sometimes determines allophones of phonemes, and sometimes neutralizes oppositions between phonemes (Halle 1959). Because there is no phonemic voiced alveo-palatal affricate in Russian, the voicing of *č* to *dž* in *alč-ba* 'hunger' creates an allophone. However, the voicing of palatalized *s'* to *z'* in *pros'-ba* 'request' neutralizes the opposition between the two phonemes /s'/ and /z'/.

The distinction between MPRs and 'pure' phonology (including automatic alternations) is much easier to make. This distinction is discussed extensively in the literature of Natural Phonology (see Donegan & Stampe 1979). Dressler 1985 (chap. 5) develops an extensive set of criteria for measuring the degree of phonologicality of a process. Donegan & Stampe argue for a black-and-white distinction between phonology and morphophonology, while Dressler argues for a less clear-cut one.

One can argue that phonology and morphophonology are learned in different ways. A child does not learn to perform phonological operations such as the voicing assimilations in Russian, but rather FAILS to learn to make distinctions of voice in obstruent clusters. The phonological rule is there by default when the underlying forms are mastered. It is therefore difficult for a native speaker consciously to resist the application of a mandatory phonological rule. It is part of his pronunciation habits; and it will affect his attempts to learn a foreign language, or to borrow foreign words into his own language.

The status of MPRs is different because the child can freely pronounce both alternates in the given phonological environment: there is nothing hard about pronouncing *wifes* as opposed to *wives*. Indeed, both pronunciations must be mastered—one for the possessive form, the other for the plural. In addition, a child must learn conceptually when to pronounce which configuration. Children may mistakenly produce the plural form without the change.

If morphophonological processes apply to borrowed stems, it is because the morphological environment is matched, not because the phonological environment is the same. Thus the Russian velar palatalization is quite regular when a native suffix which triggers it is added to a stem which ends in a velar. This can happen with foreign stems, as in *fračok*, diminutive from *frak* 'frock-coat'. However, since foreign languages have no suffixes which trigger the change, we expect no velar palatalization inside foreign words borrowed into Russian; nor does velar palatalization interfere with Russians' learning other languages.

The distinction between morphophonology and morphology is harder to draw. When one deals with ablaut systems such as that of Arabic [*q.v.*], it is difficult to decide whether to use rules to change base forms into derived forms, or to use non-linear morphology of the type suggested by McCarthy 1981. Dressler suggests a third type of rule which he calls an A[LLOMORPHIC] M[ORPHOLOGICAL] R[ULE], and he includes German umlaut among such rules. The distinction between his AMRs and MPRs, however, is not clear-cut. Theories vary in their treatment of the morphological or phonological nature of MPRs. The lexical rules of Lexical Phonology (Kiparsky 1983) look very phonological, and abstract segments are used to make them even more phonological.

Prague School phonologists such as Stankiewicz 1967, as well as Natural Phonologists, de-emphasize the phonological nature of MPRs. For them, the resemblance of MPRs to natural phonological rules is directly related to the fact that most MPRs historically were phonological rules. Any diachronic changes after they become MPRs seem to be based on morphological principles such as regularity, iconicity, transparency, or functional specialization. The phonological adjustments in MPRs may increase surface regularity and transparency, but do not render them more natural in a phonological sense (Dressler 1985, chap. 10).

One of Dressler's more interesting observations is that, to be stable, an MPR should parallel the direction of

morphological derivation. This is true of the velar palatalization in the example above, where the change can be viewed as part of the process of adding the suffix.

This raises a question as to the directionality of morphophonological operations. The only natural directionality may be fundamentally morphological, rather than being arbitrarily determined by the nature and history of the process.

However, this is more true of word-formational systems than of inflectional systems. In rich inflectional systems, we have less reason to consider members of a paradigm to be derived from a single unmarked member. It is often more reasonable to consider the paradigm as having a basic stem. The grammatically unmarked member may then have a form derived by rule. Ukrainian, for instance, has a rule which changes *o* to *i* in closed syllables. It operates in the nominative/accusative singular in words like *nis* 'nose', genitive *nosa*; this alternation seems to be very stable in the language.

Those who treat MPRs as morphological, rather than phonological, object to the use of abstract segments to make them look more phonological. Abstract segments are, however, useful descriptive devices, and the alternative to using them may be to employ powerful formal devices such as transderivational constraints (Darden 1979, 1981).

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Morphology and Syntax

Morphology, as the analysis of words, and syntax, as the analysis of sentences, jointly account for the ways in which meaning is systematically expressed by combinations of specific formal features.

1. Similarities between the domains. Both morphology and syntax concern the tactics of meaningful expressions—the atomic expressions being, respectively, morphemes within words and words within sentences. Both domains include units of intermediate size, and hence ambiguities that turn on different groupings: *unlocked* as *un-* + *locked* or as *unlock* + *-ed*; *more voracious gorillas* as *more* + *voracious gorillas* or as *more voracious* + *gorillas*. In both domains there are many idiomatic combinations: semantically, *organize* ≠ *organ* + *-ize*; *give up* ≠ *give* + *up*. And in both domains, properties of larger units are manifested on specified sub-units—the first, the last, or the HEAD [*q.v.*]. Thus PL[ural] is manifested in an English N[OUN] P[HRASE] on its head N *(the only student-s from the city)* and within that word at the end *(petroleum geologist-s)*.

2. Tactic principles involving both domains. It is common for the formatives of syntax and of INFLECTION [*q.v.*] to occur in alternation or combination with one another; thus English has alternative comparative expressions *(handsome-r, more handsome)*, while Swedish marks definiteness doubly (*det store hus-et* 'the big house'). In addition, possible syntactic arguments tend to be preserved in derivational morphology, as when the constituents of the S[ENTENCE] *The serfs rebel against*