Encyclopedia of Languages and Linguistics, Pergamon Press, 1993

there is a paradigmatic class of words that enters into the syntagmatic relation: all words referring to liquids (*coffee*, *tea*, *wine*, etc.), not to mention metonymically used terms for containers, such as a *glass*, *a cup*, and the like. Because the class in question can be characterized semantically ('all words naming potables or recipients containing them'), the syntagmatic relationship itself can be characterized more easily in conceptual terms than by an enumeration of the lexical items involved; the syntagmatic link between *to nod* and *head*, on the other hand, is easy to describe by means of a lexical enumeration. (See Coseriu 1967 for a classification of syntagmatic relations taking into account this distinction.)

2. Restrictive or Expectational Relations

Katz and Fodor's selectional restrictions (1963) were intended to block (in the algorithmic framework of a generative grammar) the production of sentences violating existing syntagmatic relationships. Thus, a selection restriction to the effect that *to hit* in the reading 'to strike with a blow' requires a constituent with the feature Physical Object as its direct object ensures that in *the man hit the colorful ball*, a reading of *ball* as 'spherical object' is accepted, whereas the reading 'festive social assembly for dancing' is blocked. However, Weinreich (1966) noted that certain sentences that should be unintelligible according to the Katz and Fodor approach (i.e., that would receive no reading) were in fact interpretable, albeit in an unusual way. So, to explain why a sentence such as *he was drinking carrots* does receive an interpretation, Weinreich replaced the notion of selection restriction by that of transfer feature. Instead of saying, for instance, that the verb *to drink* requires a direct object with the feature + Liquid, a transfer feature approach would say that the verb imposes such a feature on its direct object. Because such a transferred feature would cancel out features that are in contradiction with it (such as a feature to the effect that carrots are solid), the sentence could be interpreted as *he was drinking carrot juice*.

A transfer feature approach does not solve all the problems concerning deviant but interpretable sentences; for instance, because the interpretative flexibility is not absolute, restrictions would have to be formulated with regard to the transfer features' capacity to override existing features. That is not, however, the main point to be made here. The point is this: when syntagmatic semantic relations are interpreted in the way suggested by Weinreich, they embody flexible expectations rather than rigid restrictions. (In this respect, they resemble presuppositions, and some authors have suggested treating them like that.)

3. Motivated or Arbitrary Relations

A Firthian definition of collocation as repeated co-occurrence of words leaves open the possibility that the lexical pattern in question is not semantically determined in any way. Consider the use of prepositions in the following semantically related expressions: you bother *about*, trouble yourself *with*, and take care *of* something. There does not seem to be a readily identifiable distinction between the concepts expressed by *to bother* and *to trouble* that could explain why *about* is the appropriate preposition in one case, and *with* in the other. Similarly, someone is *safeguarded from* but *protected against* something. One considers things *in connection with* but *with respect to* something. Or, to take an example not involving prepositions, one can hear something *on the radio* but never *on radio*, whereas for some speakers of English at least, it is perfectly normal to have seen something *on TV* as well as *on the TV*. In a number of these cases, historical factors like the bleaching of metaphor probably play a role, and it might be, of course, that the semantic distinctions involved are so subtle as to remain unnoticed upon superficial inspection. In general, however, there do seem to be lexical co-occurrence restrictions that are not synchronically semantically motivated. The term collocation is reserved by some authors for such idiosyncratic restrictions on the combinability of words, in contradistinction with the other, conceptually motivated syntagmatic restrictions.

See also: Phraseology; Firth and the London School.

Bibliography

Coseriu E 1967 Lexikalische Solidaritäten. *Poetica* **1**: 293–303

Firth J R 1957 *Papers in Linguistics 1934–1951*. Oxford University Press, London

Katz J J, Fodor J A 1963 The structure of a semantic theory. *Lg* **39**: 170–210

Lipka L 1990 *An Outline of English Lexicology*. Niemeyer, Tübingen

Porzig W 1934 Wesenhafte Bedeutungsbeziehungen. *Beiträge zur Geschichte der Deutschen Sprache und Literatur* **58**: 70–97

Weinreich U 1966 Explorations in semantic theory. In: Sebeok T A (ed.) *Current Trends in Linguistics*, vol. 3. Mouton, The Hague

D. Geeraerts

Syntax and Phonology

Syntax, phonology, and the lexicon are the central and indispensable parts of the mediation between meaning and sound in language. The lexicon provides (at least) the irreducible basis of sound–meaning associations, in lexemes and idioms. Syntax and phonology together concern the rule-governed portion of this association, syntax serving (together with morphology) as the gateway to semantics, phonology as the gateway to phonetics. Both are complex systems involving units of various sizes (in syntax, these include words, phrases, clauses, and sentences; in phonology, these include features, segments, syllables, phonological words, and phonological phrases) and also involving (language-particular) generalizations about how units combine to make larger units. How syntax articulates with phonology is then a central question in the description of any particular language, as well as a major issue in the framing of a general theory of grammar.

1. Phenomena and Components

The labels 'syntax' and 'phonology' are used both for classes of phenomena and for components of a grammar.

In the first sense, syntax concerns the meaningful free units (of word size or larger) in a language and comprises everything that has to do with the combination of these

into meaningful composites, and consequently with the distribution of such units with respect to one another. ('Morphology' in this sense concerns the expression of meaning by form within words.) Also in the first sense, phonology concerns those properties of sound that are relevant in a language and comprises everything that has to do with the combination of these into pronounceable units of various sizes.

The divisions thus made between syntax and phonology are not necessarily those appropriate for a theory of grammar, which divides components according to differences in the types of generalizations (also known as 'rules') applicable within them. The distribution of meaningful units in a language can be contingent on their stylistic values (as in the anomalous conditional clause *were I to buzz off* 'if I left,' with its conflict between the formal style of the inversion in it and the casual style of the idiom *buzz off*), or on their semantics (as in the anomalous clause *I am containing DNA*, with its conflict between the ongoing-event semantics of the progressive and the state semantics of the VP *contain DNA*), or on their morphological properties (as when clauses with modals, like *I can sing*, fail to occur in a wide variety of constructions—**I want to can sing*, versus *I want to be able to sing*—because the modals lack nonfinite inflectional forms), or their phonological properties (as in the anomalous clause *to would make me happy*—cf. *to do so would make me happy* and *not to would make me happy*—with its accentually stranded *to*).

But that does not necessarily mean that rules in the syntactic portion of a grammar attend to the stylistic values, semantic properties, morphological properties, and phonological properties of syntactic units. In these particular cases a sufficient account is available in other parts of grammar, based on the assignment of pragmatic, semantic, morphological, or phonological properties to the elements of syntax and lexicon.

It is also true that the distribution of phonological properties in a language can be contingent (a) on the morphological function of the material involved (as in the contrast between the phonological effects of the /i/ suffixes in *piracy*, based on *pirate*, and *carroty*, based on *carrot*), (b) on its syntactic function (as when the auxiliary *is* can be unaccented and contracted to /z/ in *I know the party's tonight* but not in **I know where the party's tonight*), (c) on its semantics (as when the auxiliary must be contracted in the idiomatic *What's with him*?, the uncontracted *What is with him*? having some quite different literal meaning), or (d) on its pragmatic values (as when a falling intonation on *what* makes *My name is what*? a quiz question, while a high rising intonation makes it an incredulity or reclamatory question).

In examples like (d), it is plausible to suggest that pragmatic values are assigned to phonological elements, but in (a–c), something rather different seems to be going on. It appears that another component of grammar (morphology or syntax) or the lexicon is imposing conditions on the makeup of phonological units.

2. The Modularity of Grammar

The picture just sketched presumes a modular view of linguistic organization, in which (at least) phonology, phonetics, morphology, syntax, semantics, pragmatics, and lexicon are treated as to some degree autonomous domains. Most theorists adopt such a 'separation of levels,' but there are some (including many of the 'generative semanticists' of the 1970s) who have seen linguistic organization as a seamless web, in which stipulations and generalizations about the association of sound with meaning can make reference to any properties of expressions, even properties of very different sorts, and will treat these properties as all on a par with one another.

Autonomous levels of analysis are posited partly out of a desire to restrict the expressive power of grammars, so as to constrain the range of languages consistent with the analytic framework, and partly as a way of embodying the observation that interactions between two domains of linguistic organization often turn out to be quite limited, both in that the interacting properties are only a subset of those relevant within the domains and in that there is a logical directionality to the relationship, rather than a mutual conditioning.

3. Morphology-free and Phonology-free Syntax

In particular, it is generally assumed that syntax has only limited access to morphological organization. Many would say syntax is morphology-free (the 'lexicalist hypothesis'), in the sense that syntactic rules do not distribute specifically morphological properties of expressions. On this hypothesis, syntax can be sensitive to abstract properties realized in morphology, but not to specific inflectional marks for these properties (to dative case, say, but not to a particular dative case marking, or to a declension class for nouns); and it can be sensitive to syntactic subcategories of lexemes, but not to specific derivational marks for these subcategories (to abstract Ns, say, but not to just those abstract Ns with the derivational suffix *-ness*).

It is also generally assumed that syntax has only limited access to phonological properties. Indeed, it has been claimed (Pullum and Zwicky 1988) that syntax is phonology-free, in the sense that syntactic rules do not distribute specifically phonological properties of expressions. On this hypothesis, syntax can be sensitive to abstract properties realized in the distribution of phonological features, but not to the specific phonological features. Though the conditions in a syntactic rule can have certain sorts of indirect or ultimate phonological consequences (like the temporal ordering of the parts of an expression), these conditions never seem to distribute phonological properties directly; no language has a syntactic rule stipulating that some constituent begin with an obstruent, or have no more than two syllables, or contain only unrounded vowels, or have stress on its penultimate syllable.

The literature on the connection between syntax and phonology contains many apparent counter-examples to the hypothesis that syntax is phonology-free. But Pullum and Zwicky (1988) maintain that all of these dissolve on closer examination. Some are merely incorrect statements of the generalization; it is sometimes said that the inverted material in English subject-auxiliary inversion must constitute a *phonological* word (*Wouldn't I sing*? versus **Would not I sing*?), but it can be argued that the correct condition requires a *syntactic* word, that is, a constituent of word (rather than phrase) rank in the syntax. Others involve preferences or tendencies in language use that should not be seen as rules of grammar, in particular as rules of syntax;

an instance in point is the preference for having long, complex, and prosodically heavy constituents ordered at the end of their constructs (favoring the alternative ordering *We saw with pleasure sixteen beautiful birds that none of us could find in our guide books* over *We saw sixteen beautiful birds that none of us could find in our guide books with pleasure*).

Still others involve genuine regularities, but ones that belong to some extragrammatical domain; here belongs the requirement in certain forms of verse that each part of an utterance must have a fixed number of syllables in it, a requirement that is not part of the grammar of the language in question, but rather is a matter of a set of conventions for language use that build upon, or are overlaid on, the rules of grammar. A fourth collection of cases comprises genuine regularities in the grammar, regularities that belong, however, not to syntax but rather to morphology/lexicon; the presence (in *geschlagen* 'hit') or absence (in *trompetet* 'trumpeted') of a prefix *ge-* in German past participles turns on phonological properties of the verb (it is present only for a verb stem with stress on its first syllable), but the rule in question is one of (inflectional) morphology, not of syntax.

A final group of cases is exemplified by the acceptability of coordinations like *They have never and will never come to our parties*, where the existence of syntactically distinct verb forms (bare infinitive and past participle) that happen to be phonemically identical (*come*) permits one word to serve simultaneously in two different, and normally incompatible, syntactic functions. There is evidently an interaction here between phonological properties of syntactic words and their ability to occur in syntactic constructions, an interaction that Pullum and Zwicky (1988) suggest is not stipulated in the syntactic rules of individual languages, but rather is made available by a general condition on the applicability of such rules.

4. Submodularity

The large domains of linguistic organization might themselves turn out to comprise several autonomous subdomains. Pragmatics certainly embraces principles of quite different sorts, and the same has been argued for syntax, phonology, and morphology/lexicon.

4.1 Modularity in Syntax

In the case of syntax, Bloomfield (1933) distinguished rules describing sentence types (the declarative type of *Penguins cannot fly*, the yes–no question type of *Can penguins fly?*, the fragment type of *more penguins*), those describing the distribution of anaphoric elements (the reflexive pronoun in *We congratulated ourselves*, the anaphoric gap in *I ordered sushi, and Robin sashimi*), and those describing the combination of immediate constituents into constructs (for instance, the combination of the head V *donated* with its direct and indirect object arguments *huge sums* and *to good causes* to yield the VP *donated huge sums to good causes*). Modern theoretical frameworks would further separate rules describing syntactic valency (for instance, the fact that there is a class of verb lexemes, *donate* among them, eligible to occur with three syntactic arguments—a (nominative) subject, an (accusative) direct object, and an indirect object marked by the preposition *to*) from those describing how heads, their arguments, and their modifiers are assembled into constructs (for instance, the fact that a head V and its non-subject arguments can be assembled into a VP).

4.2 Modularity in Phonology

Most phonological theories have distinguished at least two subcomponents, either one concerned with morphophonemic alternants (like the word-final z – s alternation in *dogs–cats*) versus one concerned with allophonic variants (like the partial devoicing word-finally in *tag* as against the full voicing medially in *tagging*), or one concerned with nonautomatic—morphologically, lexically, or syntactically targeted and/or triggered—phenomena (like the morphologically triggered /t/–/s/ alternation in *pirate–piracy* and the lexically targeted /∅–/n/ alternation in *a, an*) versus automatic, entirely phonologically targeted and triggered, phenomena (as in *dogs–cats* and *tag–tagging*).

4.3 Modularity in Morphology/lexicon

The internal organization of a phonological component is clearly not independent of the organization of a morphological component and of the lexicon. Morphological theories building on the Greco–Roman tradition distinguish at least two subcomponents that incorporate phonological generalizations about the stock of lexemes: derivational morphology, relating the phonological properties of different lexemes' stems (*sane–sanity, anaphoric–anaphoricity*); and inflectional morphology, relating the phonological properties of inflectional forms of a lexeme to the properties of one of its stems (*dream–dreamt, sleep–slept*). To these subcomponents can be added one dealing with phonological relationships between the different stems of a lexeme (Latin present versus perfect stems *amā* versus *amāv* 'love,' *curr-* versus *cucurr-* 'run') and one dealing with lexeme-specific facts about the phonological make-up of forms—their 'shapes'—in external sandhi (*an* versus *a*). Each of these subcomponents concerns itself, at least in part, with phonological relationships, all of them nonautomatic and morphophonemic.

A rather different division of morphology (that of 'lexical morphology and phonology'; see Kaisse and Shaw 1985) posits several layers of morphology, along with its (again, nonautomatic and morphophonemic) phonological concomitants, arranged out from the stem, without any assumption that these 'levels,' or 'strata,' necessarily correspond to derivational versus inflectional morphology.

In addition to these subcomponents of morphology, there are in every language several types of generalizations about the properties of lexemes: rules that predict some such properties from others. Since they describe redundancies in the lexicon, they are sometimes called 'lexical redundancy rules.' There are, for instance, rules relating some phonological properties of forms to others (though these are usually classed as a species of phonological rule rather than as lexical redundancy rules). For instance, in German the default rule for stress placement is that if a syllable is the first one in a form (of some lexeme), then it is stressed. And there are rules relating phonological properties of lexemes to their morphological properties. For instance, in English the default rule is for adjectives and adverbs with stems of more than two syllables to lack an inflectional comparative and superlative (*shyer, worldlier, *fatherlier*).

Lexical redundancy rules do not necessarily involve phonological properties. There are, for instance, such rules relating semantic properties of lexemes to their paradigm classes (in English, nouns referring to creatures hunted for sport—*quail, moose*—belong, at least as a default, to the 'zero plural' declension class) or their grammatical categories (as when the default is for nouns referring to male creatures to belong to the gender labeled 'masculine').

The lexical redundancy rules of special interest here are those expressing some association between phonological properties of lexemes, in particular, phonological properties of their stems, and their syntactic properties, in particular, membership in a major syntactic category or in a syntactic subcategory. There are two types of such associations: those in which syntactic (sub)category predicts aspects of stem phonology, and those in which aspects of stem phonology predict syntactic (sub)category. Associations of the first type—e.g., the default in English is that if a lexeme is an interrogative proform, then its stem begins with /hw/—have been reported with modest frequency in the literature, though it is not always clear whether they represent generalizations that should be captured by rules of grammar, preferences or tendencies in language use, or accidental co-occurrences of the properties in question (having no place in a description of regularities in linguistic organization).

It appears that associations of the second type are even less secure than those of the first type. It is unclear whether there are any firm examples of real linguistic generalizations that predict syntactic (sub)category of a lexeme from phonological properties of its stem. For instance, it has been claimed that the default in English is that if a verb lexeme with semantics involving agent, patient, and recipient roles has a monosyllabic stem, then it can occur as head in the double-NP-object construction of *I'll give Chris flowers* and *We told Robin stories*; indeed, it has been claimed as well that membership in this syntactic subcategory also predicts (at least as a default) the monosyllabicity of stems. The first claim says that *give* and *tell* should belong to the subcategory, the second that *donate* and *divulge* should not. But when semantic regularities are factored out of the data—for example, means-of-communication verbs like *cable* and *telegraph* generally belong to the subcategory (however many syllables they happen to have), and manner-of-speaking verbs like *lisp* and *scream* generally do not (again, regardless of their number of syllables)—there seem to be no significant generalizations left, beyond the overall tendency in English for lexemes, or at least frequent lexemes, to have monosyllabic stems.

5. Phonological and Syntactic Rules

The discussion to follow does not further explore the relationship between syntax and the phonological side of morphology. Instead it focuses on automatic phonology—simply 'phonology' in this discussion—and its relationship to syntax.

Rules of the syntactic and phonological components of a grammar distribute *target* properties of very different sorts and operate within *domains* of different types.

5.1 Phonological Rules

Phonological rules describe the content of phonological (or 'prosodic') domains of various sizes, from segments and syllables through phonological words, phonological phrases, intonational phrases, and phonological utterances. (The inventory of domains is a matter of controversy; in particular, several domain types lying between the phonological word and the phonological phrase, and between the phonological phrase and the intonational phrase, have been proposed.) The ultimate units are purely phonological properties like syllabicity, voicing, nasality, obstruency, and high tone. For each type of domain, rules describe how phonological constituents of some smaller domain are distributed with respect to one another—how they are organized in time, by simultaneous or successive occurrence—so as to form instances of the larger domain.

Phonological rules can stipulate that some property is distributed within a domain (e.g., nasality in the coda of an English syllable spreads to the nucleus of that syllable, but not to an adjacent syllable, as in the second syllable of *iron, Haldane*, and *balloon*), at the edge of a domain (e.g., syllable-final obstruents in German are devoiced, as in *Bund* 'band, covenant' and *Bundbruch* 'treaty violation'), or across domain boundaries (e.g., in fast speech, syllable-final /n/ in English assimilates in point of articulation to a following syllable-initial obstruent, so that *infamous* can have a labio-dental nasal in its first syllable and *incongruous* a velar one).

It can often be unclear as to whether the domains within which, at the edge of which, or between which phonological properties are distributed are phonological or morphosyntactic. Given that there are generalizations about the phonology of stems of lexemes (the default Latin perfect stem is the present stem plus *-v/-u*), forms of lexemes (the default English past tense verb form is the stem plus /d/), and shapes these forms take in syntactic combinations (the 'reduced' shape of a form of an English auxiliary verb is its final consonant: /z/ for *is* and *has*, /d/ for *would* and *had*, etc.), it might not be clear whether a particular phenomenon involves a generalization about forms of lexemes versus phonological words, or about shapes of forms versus phonological words/phrases.

5.2 Syntactic Rules

To a large extent syntactic rules distribute purely *syntactic* properties of various sorts: major syntactic category (e.g., V), syntactic subcategory (e.g., auxiliary V eligible to invert with a subject), rank (word, phrase, or clause), grammatical relations (e.g., subject-of), and constituency (e.g., divisibility into a subject constituent and a VP constituent).

But there are also properties that are 'cashed out' in inflectional morphology (e.g., case in government; person, gender, and number in agreement), in the selection of particular 'grammatical marker' lexemes (like infinitival *to* in English), and in phonology—in prosodic properties like intonation contours and boundary tones (e.g., the rising terminal intonation of English yes–no questions), in phonological alternations (in effect, 'phrasal inflections') affecting the edge segments of syntactic constituents (like the Welsh consonant mutations affecting the first word of a phrase and triggered by, among other things, certain specific prepositions, as in *wedi pob cath* 'before every cat,' *ar bob cath* 'on top of every cat,' *â phob* /fob/ *cath* 'with every cat'; or the English possessive suffix /z/, attached to the last word of a phrase, as in *one person I know's opinions*), in the

presence or absence of some constituent with phonological content (e.g., the gap in information questions like *What did you make*? or the missing subject in imperatives like *Behave yourself!*), and indeed in the temporal ordering of words.

6. Stacking of Domains

A striking difference between syntactic and phonological organization is that in syntax it is common for units of some type to properly contain units of the same type (as in the stacked VPs in *might have been being attacked*), even to the point of recursivity (as when finite clauses contain finite clauses: *That your evidence demonstrates the point demonstrates that my argument demonstrates nothing*). Stacking is rare for the units of phonology—many would maintain that it does not occur at all (the strict layer hypothesis of Nespor and Vogel 1986)—and recursivity is unknown; there is no such thing as a syllable containing other syllables, or a phonological phrase containing phonological phrases of similar type. This difference presumably follows from the different functions of syntax and phonology, syntax providing units (syntactic constituents) that are semantically interpreted, phonology providing units (phonological domains) that are phonetically interpreted.

7. The Morphosyntax–phonology Interface

Given the very different functions served by syntactic constituents and phonological domains, it is no surprise that a single expression can be subject to very different hierarchical organizations in the two components.

This point is familiar from morphology. Though phonology for the most part pays little attention to morphological structure, there are circumstances in which morphological structure conditions phonological organization. For instance, in English the strong (secondarily stressed and semantically transparent) prefixes *mis*-and *dis*-, as in *mistabulate* and *distaste*, can be maintained in separate syllables, whereas /s/ is otherwise obligatorily syllabified with a following voiceless stop, as in *pastiche*.

Phonology *always* pays some attention to syntactic structure. The organization of an expression into syntactic words, phrases, and clauses serves as the basis for its organization into phonological words and phrases. For instance, there is normally a phonological phrase break in English between the subject of a clause and its VP: [*All of us*] [*love spinach*], [*People from Italy*] [*all love spinach*].

But phonological domains can cut across syntactic constituents, as frequently happens with syntactic words that are phonologically dependent on adjacent material: English complementizer *that*, phonologically dependent on immediately following material, as in the phonological phrasing [*I know*] [*that soon*] [*I'll win*]; and infinitival *to*, phonologically dependent on immediately preceding material if it cannot 'lean' on following material, as in the phonological phrasing [*I'll soon*] [*persuade them to*]. Consequently it is not enough for a grammar to specify for each expression what constituents of morphology/syntax it has within it and what domains of phonology it has within it. The grammar must also include generalizations about how (morpho) syntactic spans are associated with phonological domains: rules of 'prosodic domain formation.'

7.1 Prosodic Domain Formation

The investigation of prosodic domain formation rules is in its infancy. Some such rules are specific to individual lexemes or small classes of them; this is the case for the facts just cited about *that* and *to*, and it also applies to the distribution of unaccented object pronouns in English, which must form phonological phrases with their immediately preceding heads: *I gave the fight up*, *I gave it up* (where *gave* is *it*'s head), *I gave up the fight*, **I gave up it* (where *up* is not *it*'s head). Other prosodic domain formation rules are more general, gathering a variety of different syntactically related items into phonological domains.

A number of proposals have been put forward for such general mappings between syntactic constituency and phonological domain organization; see Kaisse and Zwicky (1987) for a variety of these. It has been suggested that phonological domain formation is sensitive, among other things, to the difference between maximal and nonmaximal phrases in syntax (in *They might have been being attacked*, *might have been being attacked* is a maximal VP, and all the other VPs are nonmaximal), to the location of the edges of syntactic phrases, to the location of the edges of clauses, to the difference between syntactic constituents that are (nonbranching) syntactic words and those that are multiword phrases (unmodified nouns versus modified nouns, or intransitive verbs versus transitive verbs), and to syntactic relations between adjacent constituents, in particular to the difference between modifying (or adjunct) dependents of a head and argument (or complement) dependents.

A typical proposal is that of Chen (in Kaisse and Zwicky 1987) for tone groups in Xiamen Chinese. These domains, within which tone sandhi rules apply, are picked out (in part) by requiring that every end of a maximal phrase in syntax is also the end of a tone group in phonology.

7.2 Direct versus Indirect Syntactic Conditioning

Prosodic domain formation rules provide a means for indirect syntactic conditioning of phonological rules. Syntax specifies one set of properties of expressions; prosodic domain formation rules relate these to a different set of properties, phonological in character, which include organization into phonological domains; and phonological rules apply within the domains of the latter sort.

The discussion in Sect. 4.2 and 4.3 above also allowed for direct syntactic conditioning of rules distributing phonological properties, though such rules would be classified as lexical/morphological rather than properly phonological. These are nonautomatic phonological rules that must be viewed as applying within, at the edges of, or between syntactic constituents—rules governing 'shapes' in the terminology used above, 'P1 rules' in the terminology of Kaisse (1985), 'precompiled lexical phonology' in the terminology used by Hayes (in Inkelas and Zec 1990). There is some controversy as to whether there are any such rules; the alternative is to maintain that any syntactic conditioning is indirect, to claim that prosodic domain formation rules, themselves sensitive to (morpho)syntactic organization, establish the appropriate spans, within which entirely automatic phonological rules apply.

The alternative has a theoretical point in its favor, since it entirely eliminates one class of rules (syntactically constrained nonautomatic rules) in favor of types of rules (prosodic domain formation rules sensitive to syntactic

organization; automatic phonological rules) whose existence is not in question. In practice, deciding between direct and indirect syntactic conditioning is not an easy matter, turning largely on the question of whether generalizations are better captured in nonautomatic phonological rules or in prosodic domain formation rules. The literature covers a wide range of phenomena, both clitics (see *Clitics*), such as the English reduced auxiliaries, and external sandhi, in a variety of languages including Italian (syntactic doubling), French (liaison), Mandarin Chinese (tone sandhi), and Matumbi (vowel shortening; see also *Sandhi*).

7.3 Surface versus Remote Syntactic Conditioning

Some syntactic theories posit more than one level at which the syntactic properties of an expression are described—one or more levels of 'remote' representation, in addition to the 'surface' level. In such theories the question arises of whether factors available only at a remote level can condition phonological rules (either directly or indirectly). Though there is some tradition for permitting such a relaxation in theoretical assumptions, the weight of opinion is in favor of the simpler theory, in which all syntactic conditioning is superficial.

Several English phenomena have been the focus of discussion on this point: the reduction of auxiliaries (*I know where it's been* versus **I know where it's*), contraction of *to* with a preceding verb (*What do you wanna make*? versus **What do you wanna vanish*?), and the assignment of stress and intonation contours to sentences (the infinitival relative interpretation favored for *I have plans to leave* versus the noun-complement interpretation favored for *I have plans to leave*).

Bibliography

Bloomfield L 1933 *Language*. Holt, New York

Inkelas S, Zec D (eds.) 1990 *The Phonology–syntax Connection*. University of Chicago Press, Chicago, IL

Kaisse E M 1985 *Connected Speech: The Interaction of Syntax and Phonology*. Academic Press, New York

Kaisse E M, Shaw P A (eds.) 1985 *Phonology Yearbook. Vol. 2: Phonology and the Lexicon*. Cambridge University Press, Cambridge

Kaisse E M, Zwicky A M (eds.) 1987 *Phonology Yearbook. Vol. 4: Syntactic Conditions on Phonological Rules*. Cambridge University Press, Cambridge

Nespor M, Vogel I 1986 *Prosodic Phonology*. Foris, Dordrecht

Pullum G K, Zwicky A M 1988 The syntax–phonology interface. In: Newmeyer F J (ed.) *Linguistics: The Cambridge Survey*, vol. 1. Cambridge University Press, Cambridge

Arnold M. Zwicky

Syntax and Pragmatics

A Rottweiler bit me last week. (1a)
I was bitten by a Rottweiler last week. (1b)
It was a Rottweiler that bit me last week. (1c)
Last week I was bitten by a Rottweiler. (1d)
What bit me last week was a Rottweiler. (1e)

There are few lexical differences among these five sentences but each of them has a distinct syntactic structure. These differences in the type and order of phrases seem to make no difference to the objective information content of the sentences. They are all true at a given time if and only if a member of the class of Rottweilers is in the relation of having bitten the speaker a week prior to the time of utterance; otherwise they are all false. So a speaker who wants to convey that information has at least these five means at her disposal. The questions of interest here are what governs the speaker's choice of one rather than any other of these options—is it random?—and what, if any, difference does the option chosen make to the hearer's understanding of the utterance? Before responses to these questions are considered some preliminaries are necessary.

1. Syntax, Semantics, and Pragmatics

The subject here is the relation between syntax and pragmatics but coming to grips with this is difficult without bringing in a third participant, semantics. In order to appreciate the peculiarly pragmatic effects that particular syntactic structures may have some understanding of the difference between semantics and pragmatics is needed. Traditionally, syntax is taken to be the study of the combinatorial properties of words, semantics to be the study of meaning and pragmatics to be the study of language usage. 'Meaning' is a very vague term and a distinction between semantics and pragmatics along these lines leaves open a wide range of quite different ways of construing the subject matter of the two fields. A sharper distinction can be made between two aspects of utterance meaning: (a) those elements of meaning that can be directly decoded from the linguistic expressions used, that is, meaning which they have across all contexts of use, and (b) those which depend on extralinguistic contextual information and the interpreter's inferential abilities. So, for example, B's response to A in (2) communicates information about B's impression of the person referred to by A in the previous utterance as Mary. A would most likely understand B as making a remark about Mary's personality rather than her temperature and might well infer that B did not very much like Mary, on the assumption that coldness of personality is not a likable feature:

A: Did you like Mary? (2)
B: I found her very cold.

Now the words actually uttered fall far short of encapsulating this information in and of themselves: *her* is a word that can be used to refer to any female creature, *cold* is ambiguous between the temperature and the personality understandings, and the sentence contains no words encoding concepts to do with liking. These processes of assigning a referent to the pronoun, of disambiguation and of deriving certain implications from an utterance are pragmatic processes. What is meant by this is that they depend on the assumption that speakers observe certain standards of rational cooperative behavior when they communicate and that hearers interpret utterances with these standards in mind. Without this assumption A (and the reader) would have no grounds for thinking that B is talking about Mary and is making a remark about her personality. Just what these standards guiding communication are will be considered in the next section.

So utterance understanding is a two-phase process. The first phase is the automatic decoding of linguistic content