Abstracts

of all

main reports (30 minutes)
and
section papers (15 minutes)

for the

SIXTH INTERNATIONAL PHONOLOGY MEETING
and
THIRD INTERNATIONAL MORPHOLOGY MEETING

July 1-7, 1988 --------------------- Krems, Austria
CONTENTS

A.Yu. Alkhenvald: Towards a classification of clitics and their relation to morphology and syntax ................................................................. 1
Paul Kent Andersen: The inflectional "passive" morpheme: A case of mistaken iconicity ................................................................. 2
Stephen R. Anderson: Sapir’s approach to typology and current issues in morphology ................................................................. 3
Kristján Arnason: Problems in the lexical phonology of Icelandic .......... 4
Cinzia Avesani & Mario Vayra: Rules vs. regularities in Italian intonation ...... 5
Robert Bannert: Tonal elements and tonal features in sentence level intonation ................................................................. 6
Leslie Barratt: Stridency preservation in language ..................................... 7
Hans Basboli: The Danish stød as a case of phonology-morphology interface ................................................................. 8
Margherita Basilio: Discourse related word formation processes in Brazilian Portuguese ................................................................. 9
Ouul Bat-E: Is morphological structure relevant to phonological rules? Evidence from Semitic ................................................................. 10
Silvia Bauer, Markus Kommenda, Gernot Kubin & Armand Rouveret: The role of morphology within a German text-to-speech system ................................................................. 11
Robert Beard: The empty morpheme hypothesis ...................................... 12
A. Bélova: La flexion interne ou bien une espèce particulière d’affixe? .......... 13
Pier Marco Bertinetto: Happiness and misery of experimental phonology ................................................................. 14
Manfred Bierwisch: A modular theory of affiliation .................................. 15
Geert Booij: Lexical phonology and prosodic phonology ......................... 16
Jill Carrier-Duncan & Janet Randall: Resultatives .................................. 17
Andrew Carstairs: On phonologically conditioned suppletion ................. 18
Gábor Prószéký: Automatic morphological analysis of agglutinative languages ................................................. 64

Daniel Recasens & Josep Martí: Phonology and speech perception: The case of nasal stops ........................................ 65

Jørgen Rischel: Areal features and diachronic phonetic universals ................................................................. 66

Igyey Roca: Constraints on extrametricity .................................................. 67

Samuel Rosenthal: The representation of prenasalized consonants ................................................................. 68

Mario Saitarelli: How syntax becomes morphology ......................................................................................... 69

Sergio Scalise: Productivity, inflection and derivation ....................................................................................... 70

Chris Schaner-Wolles: The morphological acquisition of regular vs. irregular paradigms: Plural vs. comparative in German ................................................................. 71

Lieselotte Schlefer: ‘Voiced aspirated’ or ‘breathy voiced’ and the case for articulatory phonology .................... 72

Walter F. Sendimeier: Modification of strategies in feature extraction ............................................................. 73

Michael Shapiro: On a universal criterion of rule coherence ........................................................................... 74

Norval S.H. Smith: An integrated hierarchical system of place features .......................................................... 75

Maria-Josep Solé: Experimental Phonology: the case of rhotacism ................................................................. 76

N.V. Solnceva: Skrytaja morfologija .................................................................................................................. 77

Andrew Spencer: Morpholexical phonology ................................................................................................. 78

Jolanta Szpyra: Between separation and Integration .......................................................................................... 79

Elmira Ternes: Initial mutations in Celtic and in West African ........................................................................ 80

Yishai Tobin: A combinatorial phonology of the Hebrew triconsonantal (CCC) root system ........................................ 81

Rébecca Treiman: Experimental studies of syllabification .................................................................................... 82

Théo Vennemann: Phonological diachrony, typologies, and universals ............................................................. 83

Olle Vlks: Relations between phonological and morphological patterns ............................................................ 84

Irene Vogel: English compounds in Italian: The question of the head ................................................................ 85

Henriette Walter: Dynamique et diversité des usages en phonologie ............................................................... 86

Beatrice Warren: The Importance of combining forms ......................................................................................... 87

Jürgen Weissenborn: Syntax or morphology? The acquisition of clitic pronouns in French ........................................ 88

Kalévi Wilk: Vowel harmony from a universal point of view .................................................................................. 89

Maria Wingstedt: Perceptual learning of systematic vs. unsystematic foreign accents ............................................. 90

Sidney A.J. Wood: Radiographic and model studies of tense and lax vowels ....................................................... 91

Wolfgang U. Wurzel: The mechanism of inflection: Lexicon representations, rules and exceptions .................... 92

Wijscher Zwanenburg: Word formation and inflection ......................................................................................... 93

Arnold M. Zwicky: Inflectional morphology as a (sub)component of grammar .................................................... 94
Towards a classification of clitics and their relation to morphology and syntax

A.Yu. Aikhenvald
Institute of Oriental Studies, Moscow

To our opinion, clitics in any languages form a constructive class of morphemes, a subgrouping distinguished on purely phonetic reasons as a component of linear pronunciatory organization of the text in a given language. Clitics may be opposed to affixes and roots (and/or different classes of them). The clitic boundary, as any other boundary, is a phonetic unit, with specific phonetic processes occurring. Apart from such trivialities as classifying clitics into enclitics and proclitics, one may propose to classify clitics on following parameters. A. Clitics and phonology, which implies a classification of clitics within themselves as to what different processes occur on the clitical boundary (so, we'll have 4 different classes of proclitics in Hebrew and 1 class of enclitics, and at least 2 classes of clitics in Hittite). B. Clitics and syntax. This parameter is not devoid of sense, for syntax is bound with the pronunciatory characteristics of the text and so is linked with linear representation of text-consisting morphemes. One can name the following strategies as to the relation between clitics and syntax (1), in the sentence there is one place specifically assigned for clitics only. Most often, it is the position in compliance with the "Law of Ackerman" for "indo-European languages, i.e. the position after the sentence initial stressed element. Such is the situation in Hittite (and all the "Anatolian" languages: Gutiele, Lydian, "Clycan"), Berber, some Cushitic (Somali) and some languages of South-East Asia (South-Sulawesi). Each clitic has its specific place, or rank, in the complex of clitics, which can not be violated, though itself it generally violates the projectivity of the sentence. In the same languages clitics of different kind (so, constituting a separate class) may exist, which can occupy a position out of the clitics complex being adjoined to those phonetic words with which they are semantically bound, as "Hittite -ma 'but' etc. (as, and a thematic organization marker)". Berber "Beni Snus qfi (an affirmative particle). 2). Clitics have no specific place in the sentence, so they don't interfere with syntactic properties of the sentence (as projectivity, see 1,) and tend to unite into one phonetic word with groups, with which they are either syntactically or at least semantically linked (the first case, with syntactical and semantical links, is represented in Modern and Biblical Hebrew, the second in Russian). C. Clitics and morphology. This link has actually played a great role in the historical morphology, consider hypotheses on the genesis of affixes from clitics in Indo-European, Afro-Aratic and Uralic languages. In synchrony, most widespread clitics are particles (all kinds of), pronouns, rarer are clitical verbs and nouns (as in Somali). In languages, in which clitics have specific inflectional categories, it would be reasonable to posit them as a part of speech apart (as in Somali).
The inflectional "passive" morpheme: A case of mistaken iconicity

Our modern linguistic term "passive" has its origin in the Greek grammatical tradition, where we find reference to three diatheses, i.e., ἐνέργεια, ὁποτός and μετάφρασις (traditionally translated as active, passive and middle respectively), cf., e.g. the relevant passage in Thrax's grammar:

The inflectional middle (μετάφρασις) appears after markers for mood and especially tense and hence (i) it belongs to the "active" and (ii) is itself not responsible for changing the valence of the verb. Furthermore, the inflectional middle may be expressed in numerous languages throughout the world by a clitic reflexive and is generally employed in numerous constructions ranging from reflexives and reciprocals through typical "middle" constructions to the "passive". All of these constructions have the following common semantic feature: all represent constructions in which the "subject" is affected (N.B. the meaning of the Greek term μετάφρασις) by the action of the verb. Thus we have no grounds for establishing the existence of an inflectional morphological category "passive" as distinct from the "middle". We are therefore not justified in ascribing specific syntactic and semantic functions to an "inflectional passive" morpheme. Given the one and the same form of the verb can be employed with radically different syntactic and semantic structures, we finally find that there is a very low iconic relationship (if any at all) between morphology and syntax and semantics.
Problems in the lexical phonology of Icelandic

Kristján Arnason
U Iceland

Kiparsky (1984) has maintained that u-umlaut is a lexical phonological rule in Modern Icelandic, and still active. It is supposed to operate in the lexicon, both in derivation (level 1) and inflexion (level 2), but not postlexically, at which stage e.g. the enclitic article is added. The paper will show that u-umlaut also does not apply in compounds and some derivational classes.

Explicitly, or at least implicitly, it is claimed by lexical phonology that morphological stratification and phonological stratification correspond, and that morphological derivation and phonological 'formation', so to speak, go hand in hand. But it seems also to be claimed that phonological lexicalisation goes hand in hand with lexicalisation on the content plane or on the morphological plane. I want to maintain that this is too simplistic a conception of the relation between morphology, phonology and lexicalisation.

The problem is that there is confusion between morphologization and lexicalisation of phonological structure, both of which are historical processes, but by no means the same thing.

By morphologization, alternations originally brought about by phonetic processes become phonologically opaque, but still survive in spite of the loss of the phonetic motivation, by becoming morphologised, i.e. by acquiring some morphological function as an exponent of a morphological category.

Lexicalization forms a list of predefined signs, and phonological information is stored in the lexicon, as part of the characteristic of these signs. The limiting case is the information about the phonetic shape of each particular formative. (Cf. Kiparsky's (1982) conception of a lexical entry as a rules defining the phonological characteristics of lexical items.) But generalisations concerning the phonological shape of morphological classes, i.e. morpheme structure rules, are of the same nature.

The paper will investigate, with the help of data from Modern Icelandic, in what respect some claims made by lexical generative phonology differ from those made by traditional morphophonemics.

References:

Tonal elements and tonal features in sentence level intonation

Robert Bannert
U Lund, Sweden

A few years ago, I sketched a model for German intonation that, due to its basic structure, may be valid also for other languages than German. Another basic feature of this model is that it contains two components: one for the global sentence intonation and one for the local word accents. As a consequence of linguistic information in statements and questions which are uttered as one single prosodic phrase, it is claimed that the model will generate the appropriate intonation as a pitch curve.

The model was constrained to the domain of one prosodic phrase. Reducing this initial constraint, an expanded intonation model will be presented which is able to process sentences that are structured into two or more prosodic phrases. Due to the regularities of tonal features in the extensive material investigated, phonological and phonetic rules will be formulated to serve as a basis for the expanded intonation model. The sentences described contain prosodic phrases that are delimited by junctures. The phrase boundaries are marked twice: tonally by a high tone at the end of the non-final phrases and temporally by a pause. Syntactically the junctures correspond to two kinds of boundaries, namely phrases and subordinate clauses.

It will be discussed how many boundary tones, one or two, have to be included in the linguistic component. The tone at the end of a prosodic utterance, i.e. the sentence intonation category, as well as the tone at the end of a non-final prosodic phrase, i.e. the phrase boundary tone signaling continuation, could be marked by only one boundary tone. However, due to functional, not phonetic, reasons two different boundary tones could be applied: one for the final prosodic phrase of an utterance, i.e. the sentence boundary tone and one for the non-final prosodic phrases, i.e. the phrase boundary tone proper.

The pitch curves of German utterances that contain several prosodic phrases show a typical, recurring pattern. The intonation of the phrases (the bottom line actually) appears as tonal, falling ramps that are characterized by resetting. This is also true of the first phrase of an utterance which functions as the subject of the sentence. The tonal ramp of this phrase remains falling even if the subject phrase is expanded considerably.

Using the rules of the intonation algorithm, pitch curves are generated in prosodically structured utterances. By means of LPC-synthesis, the perceptual validity and acceptability of the tonal rules are tested.

Stridency preservation in language

Leslie Barratt
Dept. of English, Indiana State U

This paper discusses the types of consonantal assimilations that languages invoke and the role certain consonants play in determining the focus of such rules. It is shown that while a wide variety of assimilations is possible, some patterns emerge. First, it will be argued that changes in manner of articulation generally assimilate less sonorant consonants to more sonorant ones rather than vice versa. Interestingly, however, one type of assimilation which does not occur concerns strident consonants. Stridents may assimilate in voice to other obstruents (in Russian, [dɔt] 'daughter' but [do]b) 'daughter would' for example), as well as in point of articulation (to other stridents in Arabic (e.g. /ma’dっiya/ and Hungarian /ma’ka’ttsi/a/makats tsitsa/ 'obstinate kitten'), but it appears that, at least in phonotactic rules (i.e. surface-true rules which are only phonologically motivated), stridents do not assimilate to other consonants so that they lose their stridency. In this respect, the behavior of stridents contrasts with that of other consonants in that nonstridents can assimilate in manner of articulation. For example, stops can become continuants (by affrication or spirantization), nasals can denasalize, oral consonants can nasalize, nonstridents can become strident, etc. Finally, this paper relates the above findings to the discussions of sonority hierarchies presented by Hantam and Aissen (1974), Wheatley (1981), and Steriade (1982), among others and to the discussions of hierarchical feature representations in Clements (1985) and Sagey (1986).


The Danish stod as a case of phonology-morphology interface

Hans Basboll
Odense U

The Danish stod is a type of glottalization (like creaky voice) occurring at a definite place (viz. in the latter part of a long vowel, or immediately after a short vowel which is followed by a tautosyllabic sonorant consonant) in certain syllables with primary or secondary stress (cf. Fischer-Jørgensen in ARIPUC 1987 and Basboll in EL XIX 1985 with references). The specific phonological representation of stod in terms of a laryngeal tier or the like will not be discussed here. In Basboll fortho. (Bertinetto and Loporcaro: Certamen Phonologicum I, Pisa: SNS), I have attempted to account for a large part of the stod-problems (disregarding compounds and heavy derivatives, however, see below) in a framework inspired by Hyman's Theory of Phonological Weight (1985), viz. as "a signal for heavy (i.e. bisomic) ultimate or antepenultimate syllables", or perhaps better, "a signal for heavy odd-numbered syllables (counted from the end of the word)". Notice that this "main stod rule" mentions neither "phonetic or phonological" stod-basis", nor conditions on stress, which is unavoidable in all other stod-proposals I know of. My account is basically phonological, but the underlying form of lexical items is relevant. In an example like 'sofa, sofaen' "sofa, the sofa" ([so:fa, 'so:,frt:,
li: 'ne9J.v.s:,'efterligning' "assessment of taxes after the main assessment" (composed of 'efter" "after" and 'ligning" "assessment of taxes") ([ek'der-ligning] [ek'der-ligning] [ek'der-ligning] [ek'der-ligning] [ek'der-ligning]). It is the main purpose of my contribution to discuss such examples from the point of view of phonology-morphology interaction, and to sketch a coherent model of Danish word prosody involving different linguistic components (stress-reduction in compounds is relevant in this context since stod presupposes at least secondary stress).
Is morphological structure relevant to phonological rules? Evidence from Semitic

Outi Bat-El
UCLA

The question addressed in this paper is whether phonological rules are sensitive to morphological structures (i.e., boundaries). I would like to claim that the answer is no; phonological rules are sensitive to phonological information only (i.e., segments and prosodic units). Boundaries can be eliminated by restricting the rules to apply in certain levels of the lexical phonology (Kiparsky 1982; in The Structure of Phonological Representation v.1), and to derived environments (Kiparsky 1973; in Three Dimensions of Linguistic Theory). The claim that nonphonological elements do not appear in phonological representations has been made by Hyman (1978 in Universals of Phonological Representation v.I) and others, and discussed in Dressler (1985; Morphology). The interest of this paper is that the claim is made with respect to Semitic, whose rich morphological structure has been argued to be referred to by phonological rules.

I will discuss Modern Hebrew Metathesis, a rule which has been claimed to be morphologically conditioned (Bolonyk 1980; LI 11:14). Metathesis applies to a /t/-plus-sibilant sequence across the boundary of the fifth binyan; e.g., /hita'aref/ → [hit'a'ref] 'he joined' (but /hi-ta'in/ → [hit'si] *[hi'tasi] 'he fermented' and /t+huva/ → [tu'va] *[tùva] 'a reply'). This rule is checked against the following basic claims of the nonconcatenative morphological theory (McCarthy 1981; LI 12:3 and 1986; LI 17:2): (a) distinct morphemes are represented on separate segmental tiers, and (b) at a certain stage in the derivation a process of Tier Conflation takes place, which removes morphemic distinctions. As has been shown in Bat-El (1980; to appear in LI 193), the ordering of Metathesis with Voicing Assimilation shows that Metathesis must follow Tier Conflation, but at the same time it is sensitive to the morphemic distinctions which were supposed to be removed by Tier Conflation.

The ordering paradox raises the question whether boundaries are there in the first place. An alternative analysis would restrict Metathesis to derived environments, within the appropriate level ordered phonology and morphology. On the basis of such an analysis I will claim that words (in Semitic in particular) do not have morphological structure beyond the word formation rules. I will show that McCarthy's arguments for morphological structures can be eliminated under the basic assumptions concerned with the feature geometry proposed by Clements (1985; in Phonology 2 Yearbook). In general, I think that a theory which eliminates phonological reference to morphological structure is more constrained, and the burden of proof lies on the proponent of the contrary theory to show that distinct morphemes are represented on phonologically separate tiers.

The role of morphology within a German text-to-speech system

Silvia Bauer, Markus Kommenda, Gernot Kubin & Amanda Pounder
Institut für Nachrichtentechnik und Hochfrequenztechnik, Technical University of Vienna

A central problem in speech synthesis with unrestricted vocabulary is the automatic derivation of correct pronunciation from the graphemic form of a text. The software module GRAPHON (GRAPHeme-to-PHONeme-conversion) has been developed to convert any German text into its phonetic transcription (LPA), enriched by some prosodic markers.

The system was designed in a way to meet the particular demands of the German writing-system rather than with the aim of universality. In comparison with English or French, German spelling reflects pronunciation much more systematically. Since, however, pronunciation and stress rules take knowledge of the morphological structure of a given word for granted, the conversion program presented here has been based on a morphological analysis component.

This analysis makes extensive use of a lexicon comprising some 2500 frequent morphs, which are characterized by their graphemic form on the one hand and an information tree on the other. The latter contains classificatory data pertaining to the morph itself and to those it may immediately select, they concern morphological status (lexical stem - particle - derivational morph - inflectional morph - juncture - ...), native or foreign status, and combinatorial restrictions. In addition, it has been a natural consequence of the lexicon approach to provide each entry with a representation on the phonemic level. Word pronunciation and stress can then be derived by applying a small set of context-sensitive transformational rules for phonological processes such as consonant devoicing and stress displacement. Finally, the lexicon allows the introduction of information for the assignment to parts of speech.

As it is of course not to be expected that the lexicon would ever cover the entire vocabulary, a so-called "joker-morph" has been incorporated, which can stand for any stem and which supplies, as far as possible, the otherwise available morphological, phonological, and syntactic information. This is made possible by the generalization that a German stem conforms to a number of structural principles.

The morphological component within GRAPHON thus provides each text input item with an individual characterization such that the phonological, syntactic, and prosodic components may operate upon it. This systematic approach not only serves to minimize the number of wrong transcriptions, but at the same time lays the foundation for the generation of rhythm, stress, and intonation patterns, yielding more intelligible, natural-sounding, and generally acceptable synthetic speech.
A "Lexeme/morpheme based" model of morphology (LMBM) claims that language is based on two virtually unrelated types of basic elements: lexemes and (grammatical) morphemes. Morphemes presuppose lexemes in that they are rules for modifying the phonological formants (only) of lexemes. The semantics of lexical and syntactic derivations is provided prior to morpheme insertion by independent lexical derivation rules. An entailment of this position is that morphemes are semantically and functionally empty operations on the phonological formant (only) of lexemes. It follows that semantic or functional information such as gender, agency, diminution, cannot be brought to a L-derivate by an affix (e.g. via percolation) as most contemporary theories advocate.

This "empty morpheme corollary" of LMBM is a good test of the predictive powers of LMBM compared with sign-based theories. If affixes are lexically listed items and selected for their semantic content, gender selection should be random aside from derivations distinguished by semantic gender (e.g. agentives). Gender regularities in such gender-neutral derivations, especially where marked by multiple affixes, would count as evidence that derivation, not affixation determines morpholexical categories like gender. This paper shows that the grammatical gender of the gender-neutral locative nominalizations in Slavic languages cannot be fully explained by features associated with particular suffixes. These nominalizations are generally marked by masculine, feminine and neuter suffixes.

Ser

parciran- 'park' : parciran-št-ет (N) 'parking lot'

kopirao- 'copy' : kopirao-ne-a (F) 'copying shop/room'

svinja 'hog' : svinja-ae (M) 'pig sty'

The grammatical gender is more predictable in these derivations than affixation: Locative, derivations, meaning "place In which", are consistently Fem, Locatives, meaning "place on which", are consistently Neu and Locatives based on nouns referring to animals and plants are consistently Mas, regardless of suffix. Therefore, suffix selection must be based on previously determined gender rather than gender being determined by suffix selection.
Happiness and misery of experimental phonology

Pier Marco Bertinetto
Scuola Normale Superiore, Pisa

My first example will be drawn from the area of secret languages. I will reexamine some Finnish data previously analysed by Campbell and Vago, and show that their conclusion is unwarranted. There is no evidence at all for the supposition that Finnish speakers have access to an abstract level of representation while performing the so-called kontti kiel game. This is therefore an instance of the misery of experimental phonology: the typical situation arises when the researcher is blind to the evidence provided by the data, and superposes his theoretical predictions to the actual outcome.

In my second (and third?) example(s), I would hope to exhibit some happier instance of experimental analysis of a phonological problem. It is hard for me to tell exactly what my example(s) will be, because it all depends on which experiment(s) will be ready by next spring. For the moment, I can only say that they will be drawn from the domain of prosody, and they will concern the issue of geminates, or/and the issue of timing.

If I get some felicitous inspiration, I would also try to say something general on the topic of experimental phonology; namely, to speculate on the possible consequences of the different phonological theories with respect to the experimental evaluation of phonological hypotheses.

A modular theory of affixation

Manfred Bierwisch
Nijmegen & Berlin

Affixes are bound morphemes, which function as operators that combine with their argument by way of functional composition. It will be shown that this property accounts in a general and systematic way for a wide range of special properties of both derivation and inflection. In particular the phenomena called inheritance of argument-structure can be demonstrated to follow from two conditions: (a) changes in the argument-structure of the base of derivation or inflection determined by idiosyncratic properties of different affixes; (b) general conditions on the structure of Thematic Grids of lexical items of different categories. In this way, independently motivated assumptions about morphological and semantic properties of affixes can be shown to account for characteristic effects of affixation.
An assumption of many approaches to phonology is that, if the distribution of two or more morphological alternants is predictable on the basis of the phonological context, then they must all have a single phonological representation (cf. R. Last's Unique Underlier Condition). This seems plausible, inasmuch as such alternants are usually phonologically similar. But in a substantial minority of instances the alternants are suppletive, i.e. phonologically quite dissimilar, either wholly or partly. Examples can be found in Italian, Hungarian, Turkish, Fang, Warlpiri, Fulfulde and Turkana.

The phenomenon occurs in stems as well as affixes, so constitutes a paradox for models of word-formation such as P. Kiparsky's Lexical Morphology and S.R. Anderson's Extended Word-and-Paradigm; for in these models the affixal material which motivates the choice between the suppletive alternants will not normally be present until after the stem is in place. On the other hand, the phenomenon seems to be entirely or almost entirely restricted to inflectional rather than derivational morphology. It is suggested that this restriction is not an accident. From the synchronic point of view, the phenomenon can be seen as involving the co-option of phonology to serve specifically inflectional purposes, namely to ensure inflectional parsimony (cf. S. Pinker's Unique Entry Principle) and to facilitate the achievement of paradigm economy. If so, it sheds no light on genuine synchronic phonological processes. For the phonologist, the problem then arises of distinguishing those phonologically conditioned inflectional alternations which are phonologically relevant from those which are not.

---

Children are very sensitive to pragmatic principles in acquisition, and, for example, observe the Principle of Contrast (different words have different meanings) from very early on (Clark, 1987; 1988). In word-formation, children appear to rely on three main principles as they discover the building blocks for constructing novel words. They make use of relative simplicity of form (the fewer the changes in the base form(s), the simpler the new word being constructed) and appear to place a premium on using simple forms until they have mastered the possible types of changes in form possible in their language. They rely on transparency of meaning (use known elements to form new words), and so, in a language like English, make use of compounding before they have analyzed affixes. And they rely on productivity (choose the more productive of any two forms, all other things being equal). This principle helps them choose which of two affixes to use, say, when there are no other grounds on which to choose: the more productive one is the first choice.

Principles like these - Simplicity of form, Transparency of meaning, and Productivity - have different consequences for different types of languages. The focus in this talk will be on some of the similarities and differences between English and Hebrew in children's acquisition of word-formation.
The case of consonantal harmony in Bakairi language (Carib)

Tania C. Clemente de Souza
Museu Nacional - UFRJ

The Bakairi is a language of the Carib family and it is spoken by about 600 persons, who live 520Km far from the city of Cuiabá, Brazil.

Until now four field research were done, working with a total of eight native speakers.

The aim of our communication in The Sixth International Phonology Meeting is to focus the case of consonantal harmony in Bakairi under the Auto-segmental theory. We want to know if the strategies offered by Auto-segmental will account for the inventoried facts in Bakairi language.

We also to discuss the actual necessity of demanding a phonemic level for Bakairi: it is the harmony phenomenon that conditions the traces voiced/voiceless of the stops and the fricative consonants in the body of the words. So, the phonemic contrast seems to vanish.

Finally it will be shown when and why the consonantal harmony develops in the language. We'll go back in time to the XIX century up to Von den Stein studies and in the time line we will try to point out the origins of the phenomenon.

The sonority cycle and syllable geometry

George N. Clements
Cornell U.

Research in syllable theory has brought to light a number of generalizations about syllable structure that hold widely across languages: 1. Segment order within the syllable generally conforms to the Sonority Sequencing Principle, with exceptions clustering at the periphery of the syllabification domain. 2. The Maximal Onset Principle requires onsets to be maximized at the expense of codas, and is only rarely overridden by more specific principles, such as the requirement that all syllables be heavy. 3. The Minimal Distance Principle (Hooper 1976) requires that members of a taux-syllabic cluster must not be too close in sonority, where "too close" is specified in terms of a particular distance on the sonority scale. 4. The Syllable Contact Law (Murray and Vennemann 1983) states that a syllable contact ASI is more highly valued to the extent that segment A has greater sonority than segment B. 5. Markedness criteria reveal a strong crossing linguistic preference for syllables beginning with low-sonority elements (obstruents) and ending with high-sonority elements (vowels, glides, sonorants). While representing a substantial advance in our understanding of how segments are organized into higher-level units of the prosodic hierarchy, these various observations have not yet been shown to follow deductively from more general principles.

This paper outlines a theory which views syllable organization as being organized in terms of the sonority cycle, according to which the optimal syllable shows a sharp rise and a gradual fall in sonority. More specifically, the Dispersion Principle requires that sonority be maximally and symmetrically distributed in initial and final syllables, but minimally and asymmetrically distributed in syllabic diphthongs. Sonority is characterized in terms of the three structure features (sonorant, approximate, nuclear). This principle allows us to state a complexity metric that evaluates the relative complexity of syllabic structures, and derivatively of syllables. This approach to syllabification permits us to formulate a strongly predictive theory of syllable organization which does not require language-particular characterization. It provides an explanation of the various observations cited above, and accounts for previously unexplained exceptions, such as the fact that Minimal Distance Constraints hold of initial but not final syllables. It also allows us to state a new hypothesis, the Syllable Complexity hierarchy, according to which the presence of a demisyllable of degree of complexity n in core syllable structure entails the presence of a demisyllable of degree of complexity n+1.

Furthermore, this theory brings new evidence to bear on the controversial question of syllable organization, showing that from the point of view of their distributional properties syllables are organized into two overlapping halves, the initial and final syllables (cf. also Fujimura). The first of these corresponds to the traditional notion "initial mora" or "weight unit") in theories such as that of Hyman (1985), and the second to the traditional notion "rhyme" in theories such as that of Kuryłowicz (1948) and others. It is proposed that these units be incorporated into the prosodic hierarchy at a level between the syllable and the timing unit. On the other hand, this evidence does not provide support for nonoverlapping bipartite organization; that is, the second "weight unit/mora" of mora theory and the "onset/rhyme" theory seem not to be required as constituents, at least from the point of view of syllabification.

This paper reports an instrumental study of fundamental frequency (F0) in Yoruba, to our knowledge the first systematic study of F0 in sentence-length Yoruba utterances. We address several interrelated issues in pitch phonology. Two of these are related to traditional Africanist concerns, but have implications for models of "declination" generally:

We investigated declination in strings of identical tones (e.g., all-H utterances) to try to shed light on the relation between downstep and other factors contributing to F0 downturns, and to define idealized values for the 3 tones free of contextual influences.

Yoruba is traditionally described as a discrete-level (rather than a terrace-level) tone language, i.e., the F0 levels of the three tones (H M L) are not supposed to overlap. However, it is also described as having downstep: in a H L H or M L M sequence, the second H or M is said to be lower than the first, even when the intervening L is elided. We attempted to establish how (and whether) downstep can operate without creating tone terracing.

We recorded 5 speakers reading 12 sentences of each of the following types:

1) all-H; 2) all-M; 3) all-L; 4) questions formed from groups (4) and (5), with initial question particles ge and gie; 5) mixed tone statements beginning HH and LH; 6) -9) questions formed from groups (4) and (5), with initial question particles ge and gie.

We expect to report results from at least 3 speakers. At present we have analysed the results from one speaker and observe:

In all-H and all-M sentences there is average declination of less than a semitone. This is far less than typical values reported for European languages or for 2-tone African languages, which provides further evidence of phonological (as opposed to physiological) effects in declination. In all-L sentences there is a decline of roughly 4 semitones over the last 2 or 3 syllables, which recalls the notion of final lowering. The intervals between the average values of H M and L are on the order of 2-3 semitones.

There is no difference in overall F0 level between mixed tone sentences beginning HH and those beginning LH: the sequence LH by itself does not trigger downstep. However, there is a clear difference between the two corresponding groups of ge-questions: the initial HGH sequence does trigger downstep. Abstracting away from this downstep, questions have higher overall level than statements. The overall raising affects all three tones equally.

H is substantially higher before L than elsewhere. This finding is previously unreported. It might suggest a way of keeping the tone levels discrete while still having some sort of downstep.

Data from more speakers, in addition to confirming or modifying these conclusions, will provide the basis for the third major focus of the study, namely cross-speaker identity of tones. In particular, we hope to determine whether there is some ideal interval between tones (viz., the 2-3 semitones found in our first speaker), or whether (as suggested by work on English) speakers' intervals are defined in some way relative to their overall range.
The aim of psycholinguistic research is to shed light on the cognitive processes involved in the production and perception of language. Thus psycholinguistics is a subdiscipline of cognitive psychology rather than of linguistics, and its aims necessarily differ from those of linguistics, which is concerned with explaining language structure and language change. Nonetheless, overlap often occurs or appears to occur, where on the one hand, processing considerations and the cognitive characteristics of the language user are held to be relevant to the explanation of linguistic structure, and on the other, linguistic structure is claimed to play a role in determination of processing operations.

The relevance of a particular research project in any discipline is constrained by the nature of the specific hypothesis under test. Thus a psycholinguistic study, employing the methodology of experimental psychology, invites conclusions about cognitive structure and processes; it cannot directly illuminate linguistic issues, no matter how central a role linguistic concepts have played in the research. The relationship between psycholinguistics and phonology is in this respect no different from the relationship between psycholinguistics and other branches of linguistic science. This argument will be illustrated by specific examples from psycholinguistic research in the area of speech recognition, in particular the question of intermediate levels of representation between the incoming speech signal and the lexicon. It will be shown that processing considerations argue strongly for the existence of such intermediate representations as an alternative to direct mapping of auditory representations onto the lexicon: further, the most viable candidates for these units in terms of which such intermediate representations are constructed must be the units of phonological analysis. Cross-linguistic comparisons between languages which exhibit differences in relevant aspects of phonological structure have indicated that the nature of prelexical representations may be in part determined by linguistic experience. The role of phonological constructs in this now long-standing field of psycholinguistic research will be examined with particular reference to the constraints which the particular methodology exercises upon the disciplinary specificity of the theoretical implications to be drawn.
The paper describes MORPHY, a model for organizing the lexicon of a moderately morphological language like Italian. Italian is a moderately morphological language which has, in contrast with English, a rich inflectional morphology (nominal, adjectival, and verbal suffixes) with both regular and irregular phenomena, and a lexical morphology like the English one (prefixes and derivational suffixes). The model has been fully implemented in ZETA LISP on SYMBOLICS 3640 Lisp Machine.

In MORPHY roots and affixes are subdivided into sub-lists allowing the recognition of morphological words and the identification of morphological non-words, i.e. illegitimate combinations of actual roots and suffixes. Identification of morphological non-words is necessary for spelling correction and for speech recognition of morphological languages.

The morphemes in the lexicon are represented as sequences of phonemes and morphophonemes. This is due to our belief that such representation allows us to better analyze the morphological irregularities of Italian. The irregularity of Italian words consists of a root's reduplication for the same word: e.g. the word *ridere* 'to laugh' has the root *rid* for forms like *rido* '(I) laugh', *ridere* '(you) will laugh', etc., and the root *ris* for forms like *risi* '(I) laugh', *risero* '(they) laugh', *riso* '(she) has laughed'. Some verbs have up to four roots. The same phenomenon occurs with nominal and adjectival roots. Since this irregularity is not due to the phonemic context but to the morphological context in which the root occurs, to avoid multiplying the roots in the lexicon, we have formulated some morphological morphophonemes defined as "phonemic alternations in a definite morphological context" (3).

The system allows the user to introduce morphological words as a whole and analyses and stores them as separate roots and affixes. The system extends to irregular words that can be stored with no need for the user to store each distinct form thanks to the morphophonemes' system (4).

MORPHY has a morphological lexicon which contains about 1,000 entries that correspond to about 12,000 Italian words.

References
Formal relations and argument structure

Anna-Maria Di Sciullo
Département de Linguistique, UQAM

The purpose of this paper is to present some formal relations which are crucial in the analysis of argument structure, and to suggest how they can be implemented in a parser for morphological objects.

We will focus on the following relations intervening in the grammar: "x is the head of y", "x percolates to y", "x saturates y", "x binding y", "x controls y". The notion 'head of a word' is central in the analysis of argument structure. The head of a morphological object (in the sense of Di Sciullo & Williams 1987) determines the nature of the external argument in its derived argument structure. If the head of a word is a Noun, then the category of the word will be a N and its external argument will be REFERENCE, as in (1). The external argument of a noun is realised syntactically when the N is used as a predicate. Thus it is realised in (2) but not in (3), where the internal argument, the TH(EHE), is a -arranged by John:

(1) [lasta] [messy]: (RE,TH)
(2) This is laziness
(3) The laziness of John

The "head of a phrase" has a central role in the syntactic realization of arguments. Given the projection principle (Chomsky 1986), the argument structure of a predicate is associated to the predicate when it is in an X0 position within a syntactic projection. The head of a phrase determines the nature of the external as well as the internal arguments of the phrase. We will argue that the relevant differences between morphology and syntax with respect to the relation "x is the head of y", follow from the properties of each system, and thus they do not have to be stipulated.

It is generally assumed, since Lieber (1980), that percolation is part of the morphology. We will propose that "function composition" (in the sense of Di Sciullo & Williams 1987) is percolation of arguments in morphological objects including suffixes. In (1), the argument of the head and the argument of the non-head percolate to the top node. Thus (RE,TH) is a well-formed argument structure for the N laziness. Percolation of arguments occurs in the syntax as well. In a sentence, the external argument percolates to the VP node in order to be assigned to the NP in subject position. The target of percolation differs in syntax and in morphology, given the specific properties of the two systems. It has been proposed in Di Sciullo & Williams (1987) that arguments can be saturated within morphological objects. This is the case for English compounds such as (4). When an argument is saturated in the word, it is no longer available for saturation in the syntax, as shown in (5). Argument saturation occurs in the syntax, but under different structural conditions that we will clarify.

(4) [flowerN] [arrangeV]: (AG)
(5) John flower-arranged the flowers

We will argue that binding and control occur in morphological objects on the basis of structures such as (6) and (7). In (6) two arguments of the same type are bound. In (7a) the head controls the internal argument, whereas in (7b) it controls the external argument. The fact that binding and control in morphology are more restricted than in syntax follows from our theory, given that only X0 are analyzed by the morphology, and that X1 are opaque with respect to sentence level laws and principles.

(6) [friendN] [visitN]: (TR,EX-P)
(7a) [adviseV] [equivN]: (RE,AG-β)
(7b) [adviseV] [equivN]: (RE,AC-β)

Finally we will suggest how these relations can be implemented in a parser. The morpho-parser that we built implements the basic formal relations of head, percolation, saturation, binding, and control. It associates morphological objects, which, by definition, are not part of the lexicon, to their argument structures.

28

Wolfgang U. Dressler & Ferenc Kiefer
U Wien - HAS, Budapest

Austro-Hungarian Morphopragmatics

Formal relations and argument structure

The purpose of this paper is to present some formal relations which are crucial in the analysis of argument structure, and to suggest how they can be implemented in a parser for morphological objects.

We will focus on the following relations intervening in the grammar: "x is the head of y", "x percolates to y", "x saturates y", "x binding y", "x controls y". The notion 'head of a word' is central in the analysis of argument structure. The head of a morphological object (in the sense of Di Sciullo & Williams 1987) determines the nature of the external argument in its derived argument structure. If the head of a word is a Noun, then the category of the word will be a N and its external argument will be REFERENCE, as in (1). The external argument of a noun is realised syntactically when the N is used as a predicate. Thus it is realised in (2) but not in (3), where the internal argument, the TH(EHE), is a -arranged by John:

(1) [lasta] [messy]: (RE,TH)
(2) This is laziness
(3) The laziness of John

The "head of a phrase" has a central role in the syntactic realization of arguments. Given the projection principle (Chomsky 1986), the argument structure of a predicate is associated to the predicate when it is in an X0 position within a syntactic projection. The head of a phrase determines the nature of the external as well as the internal arguments of the phrase. We will argue that the relevant differences between morphology and syntax with respect to the relation "x is the head of y", follow from the properties of each system, and thus they do not have to be stipulated.

It is generally assumed, since Lieber (1980), that percolation is part of the morphology. We will propose that "function composition" (in the sense of Di Sciullo & Williams 1987) is percolation of arguments in morphological objects including suffixes. In (1), the argument of the head and the argument of the non-head percolate to the top node. Thus (RE,TH) is a well-formed argument structure for the N laziness. Percolation of arguments occurs in the syntax as well. In a sentence, the external argument percolates to the VP node in order to be assigned to the NP in subject position. The target of percolation differs in syntax and in morphology, given the specific properties of the two systems. It has been proposed in Di Sciullo & Williams (1987) that arguments can be saturated within morphological objects. This is the case for English compounds such as (4). When an argument is saturated in the word, it is no longer available for saturation in the syntax, as shown in (5). Argument saturation occurs in the syntax, but under different structural conditions that we will clarify.

(4) [flowerN] [arrangeV]: (AG)
(5) John flower-arranged the flowers

We will argue that binding and control occur in morphological objects on the basis of structures such as (6) and (7). In (6) two arguments of the same type are bound. In (7a) the head controls the internal argument, whereas in (7b) it controls the external argument. The fact that binding and control in morphology are more restricted than in syntax follows from our theory, given that only X0 are analyzed by the morphology, and that X1 are opaque with respect to sentence level laws and principles.

(6) [friendN] [visitN]: (TR,EX-P)
(7a) [adviseV] [equivN]: (RE,AG-β)
(7b) [adviseV] [equivN]: (RE,AC-β)

Finally we will suggest how these relations can be implemented in a parser. The morpho-parser that we built implements the basic formal relations of head, percolation, saturation, binding, and control. It associates morphological objects, which, by definition, are not part of the lexicon, to their argument structures.

Austro-Hungarian Morphopragmatics

Wolfgang U. Dressler & Ferenc Kiefer
U Wien - HAS, Budapest

From a semiotic point of view, morphopragmatics comprises the universal pragmatic foundations, on the one hand, the relations between morphological rules and their interpreters as well as the respective interpretant of a potential (or actual) output of a morphological rule on the other hand.

In this dualistic investigation of morphopragmatic phenomena of Viennese German and the Hungarian of Budapest we will first tackle the difference between the Hungarian superlative (e.g. legesleg-nagy-obb 'greatest') and excessive (e.g. legesleg-nagy-obb) and their German equivalents grösste(r) and allergroßte(r). In contrast to the superlative, the excessive has the presupposition that the referent is the greatest of already relatively great referents. Whether these are great may depend not only on the general presuppositions of the interpreter, but also on preceding context and on the context of situation.

Moreover we will deal with the diminutives in Hng. -i, -(cs)ke/a (e.g. zongora 'piano' -> zong-i, zongorá-cska, zong-a-ka) and in Vienna. -i, -erl (e.g. Hand 'dog' -> Hant-i, Hant-erl). The primary morphopragmatic locus of these rules is in a discourse in which at least one small child participates (even if only as a passive hearer), or which concerns small children. There is a pragmatic sanction against the transfer of Austrian diminutives in -i into a purely adult text world.

However Vienna. -erl, Hng. -i, -ke/a, -cske/a can be transposed metaphorically into the adult world, e.g. in conversation between siblings or childhood friends with the effect of solidarizing or evoking childhood, or between lovers in the language of love. More generally, this holds for pragmatically restricted speech situations graded according to probabilities of interpretation in socially convergent communication. In divergent communication these diminutives are liable to receive an ironic or sarcastic interpretation. Here we must solve the question how the dualism between childhood and adulthood can find a compromise (Ausgleich).

All morphological rules which contain a pragmatic variable in the description of their meaning effects are morphopragmatically relevant. If our assumption is correct that morphopragmatics must be separated both from morphosemantics and from lexical pragmatics, then one can find a new argument against the strict separation of morphosemantic derivation rules and morphotactic affixation rules (as postulated e.g. by R. Beard and A. Pounder at this congress).

Wolfgang U. Dressler & Lavinia Merlini Barbaresi, Elements of morphopragmatics.
The role of frequency, syllable structure and style in phono-morphological change

Marinel Gerritsen
Royal Netherlands Academy of arts and sciences, Amsterdam
Hogeschool Midden Nederland, Utrecht

This paper deals with some of the morphological, syntactic and stylistic factors that play a part in the disappearance of the ending -e in the inflected infinitive (the gerund) in Middle Dutch (1).

1. om tvolc mede te bedrieghene

The study has been performed on the West Flemish dialect of Bruges, a dialect that seems to be a nice example of Dressler's (1972,1980) theory developed in Stein and Gill (1980) and Gill and Shoshany (1984, to appear). Man's prosodic competence is an autonomous mental facility, not part of grammar; it governs both verbal and non-verbal behaviour. Although the theory was originally developed to account for patterns of linguistic features in metered verse, in Gill (1986,1987) it is argued that it may also be invoked to account for various phenomena pertaining to ordinary, non-artist language.

Within prosodic theory, hierarchical prosodic structures are reflected in concert by a variety of phonological, syntactic and semantic features, termed prosodic markers. For example, in an iambic (weak-strong) prosodic structure, the second constituent may contain more syllables, greater syntactic complexity, and greater semantic import than the first constituent. In such a case, NUMBER SYLLABLES, SYNTACTIC COMPLEXITY AND SEMANTIC IMPORT function in unison as prosodic markers, reflecting an iambic prosodic structure.

Prosodic theory provides the means for a straightforward account of the order of conjunctions within freezes. Specifically, freezes are endowed with an iambic prosodic structure, in which the first conjunct is marked weak, and the second conjunct is marked strong—as in the diagram at right. This prosodic structure is reflected by a variety of phonological and semantic prosodic markers, including the features in (1).

Notably, none of the theoretical apparatus required to account for the order of conjunctions in freezes is introduced specifically for this purpose. Each and every theoretical construct employed enjoys considerable independent motivation in a variety of domains. For example, a fewer-precede-more syllables principle (aka Pöldi's law) accounts also for a variety of facts about metered verse—e.g. that the caesura in English iambic Pentameter typically divides the line into short and then long hemistiches and about ordinary language sentence structure—e.g. the universal tendency for subjects (short) to precede predicates (long). Within prosodic theory, such facts and many others can be accounted for in like manner, in terms of an iambic prosodic structure reflected by the prosodic marker NUMBER OF SYLLABLES.

Prima facie, freezes appear to run counter to the modularity of grammatical theory, in that they allow the order of conjunctions to be determined by a combination of phonological and semantic factors, functioning in concert. However, as suggested above, the rules determining the order of conjunctions in freezes are not rules of grammar, but, rather, rules of an autonomous mental faculty, namely, prosody. Hence, the modular structure of grammar is upheld by freezes.


Recent proposals have sought to integrate various kinds of domains for the mapping of intonational constructs in English in the prosodic hierarchy (Beckman & Pierrehumbert 1986, Ladd 1986). In this paper I will show that the association domain for intonational tones cannot be equated with any one particular constituent in the prosodic hierarchy, and that the prosodic hierarchy is built independently of (and exists prior to the erection of) intonational structure. The tonal association domain may coincide with any of the constituents between the foot and the Minor Utterance; the specific constituent that the association domain coincides with is determined by the rank of the constituent containing the next association marker (=accent): the association domain of a tone chosen for accent A coincides with the highest node that dominates A which does not dominate some other accent. In this view, tonal association domains do not form independent constituents of the prosodic hierarchy, but are built in parallel with the prosodic hierarchy. The durational salience of a prosodic constituent boundary is reinforced if it coincides with a boundary separating two tonal association domains. Thus, high-ranking prosodic constituents which are not reinforced by a tonal association domain boundary may turn out to be equally or even less salient than low-ranking prosodic constituent boundaries which do.

Two tonal rules are discussed which provide evidence for this representation of intonational phrasing. One, a tone segment deletion rule, shows the effect of association domain restructuring on the shape of the pitch contour. The second, a tone copy rule, shows how there is an upper limit to the rank of the prosodic constituent that can coincide with a tonal association domain. It will be seen that this prosodic constituent is intermediate in rank between the Intonational Phrase (please note: a prosodic constituent) and the Utterance; it is referred to as the 'Minor Utterance'. Experimental results, obtained from two perception experiments, will be presented which confirm the predictions that this representation of phrasing makes about the durations of different kinds of pre-boundary syllables.

More or less implicitly, every human language has long been assigned to one or another of the three, or four, main language types proposed by classical XIXth century typologists, i.e. fusional, agglutinative, isolating, incorporating. Only in the XXth century was attention focused on an objective fact which by now has become common knowledge among linguists dealing with typology: these classical types are abstract constructs, and no language corresponds in its entirety to a given type; rather, most languages evince a certain affinity to one type, but not to the exclusion of (another) other(s), and some languages seem to present features equally distributed between two or more types.

It is necessary now to go one step further. In other words, two directions of research deserve to be explored. First, to what extent does a language belong to one or another type, i.e. what is the detail of polytypical complexity? Second, why does such a situation prevail, i.e. what are the reasons of polytypical complexity?

In order to answer these two questions, I will examine a sample of languages which bring some light to one of the most debated issues in morphological typology: the boundary between the so-called agglutinative and fusional types: Turkish, Hungarian and Kannada will provide examples illustrating the detail of polytypical complexity. As for the reasons of polytypical complexity, I will analyze two particular cases which are quite relevant to the issue, i.e. Palau and Estonian.

It will appear that in these two cases, and probably in the case of most languages all over the world, polytypical complexity is the result of phonetic evolution. Consequently, this study shows that morphology is not an autonomous domain: word structure cannot be analyzed without reference to historical phonetics, or if it is, the kind of analysis that this choice implies remains at a quite insufficient step of mere description, and does not teach us what we can expect to learn about the structural concreteness of human languages.
The effect of nasality on vowel height: The phonetic & phonological relationship in Romance

John Hajek
Pembroke College, Oxford

The effect of nasality on vowel height in languages around the world has periodically excited the interest of experts, cf. Ferguson (1975). The evidence used for researching differences widely in nature & in the number of languages used, cf. Beddor (1983). Observations regarding nasality & its relationship with vowel height have been justified for diachronic, synchronic, phonetic, morphophonemic, & phonological reasons. As a result, opinions vary greatly. The languages used as evidence also vary greatly. Some studies have used large language samples, whilst others are more restricted. Those who believe that the general effect of nasality is vowel lowering always cite French as being exemplary, although some experts argue that the lowering of vowels because of nasalization in French is rather atypical. Some argue instead that nasality raises vowels, whilst still others point to a mixed raising & lowering effect. This latter process is sometimes then seen to be a result of a phonetic (or allophonic) & phonological distinction relating to the interrelationship between vowels & nasality. According to this particular view, raising of vowels is allophonic or context derived, whilst vowel lowering is a feature of phonological nasalization. This is an interesting observation with implications as a linguistic universal. Nevertheless, a great deal of research on the matter needs still to be done.

In this paper I propose to look at developments in a small number of Northern Italian dialects. Consideration is given to vowel height in a number of given contexts, nasal & non-nasal, to determine whether in Northern Italian (& Romance in general), any distinction can be made in the development of vowel height according to phonetic vs. phonological criteria, & whether any such distinction coincides with the view that raising is due to allophonic nasalization, & lowering an effect of phonological nasalization. There are a number of advantages in conducting a study that uses Northern Italian dialects as evidence. Although the dialects are now very divergent, they are nevertheless still closely related. In some dialects, nasality has had a minimal effect on vowel height, e.g. Venetian, whilst in others developments have been extremely innovative, e.g. Bolognese. The fact that they are all Latin derived also provides for interesting comparison with the oft-cited French.

The aim of this paper is to determine the phonetic & phonological effects of nasality on vowel height & to note any differences in developments as such, as well as being useful in determining the universality of any such distinction or distinctions.

Computational morphology: Analysis by synthesis

Jorge Hankamer
University of California, Santa Cruz

There are two main problems to be addressed in morphological parsing: first is an adequate representation of morphotactics, so that only legitimate combinations of morphemes are recognized; second is the recognition of morphemes themselves, a problem made difficult by the absence of overt boundaries in surface forms and the effects of morphophonemic alternation. Corresponding to these two problems are two major questions in the current theory of morphological parsing: (a) is a finite state transition network an adequate representation of morphotactics? and (b) how is the relation between surface forms and lexical forms to be mediated?

Both of these questions will be addressed in this paper. I report on the development of a morphological parser-generator for Turkish and other agglutinating languages which uses an analysis-by-synthesis algorithm. This approach allows morpheme recognition by means of generative-style phonological rules and is consequently a richer model than the low-level model of Koskenniemi. Because of the finite-state morphotactics and strictly cyclic phonological rule application, it incorporates features of current phonological theories, particularly those of lexical phonology.

While Turkish is morphologically simple in some respects, it still presents a number of challenges to the development of a full morphological and phonological description, and consequently to the development of a parser. Such challenges include the implementation of an adequate treatment of syllable-based (and syllable-counting) rules, which will require the development of a way to implement autosegmental rules and representations; development of a general exception mechanism, including some version of the elsewhere condition to account for blocking effects; solving certain problems connected with the strict cyclicity condition; and finding a satisfactory means of dealing with morphologically conditioned root alternations.
Initial strengthening

Hans Henrich Hock
U Illinois at Urbana-Champaign

In this paper, which provides a philological basis for claims in Hock (1986 [Principles of historical linguistics]), I argue that cases of 'initial strengthening' such as the ones in (1a) and (2a) arise in languages with medial obstruent weakening and result from a quasi-analogical generalization of the obstruent pattern in (3). In (1a), strengthening yields segments identical to the medial reflexes of Latin geminates, cf. (1b). In (2), strengthening changes sonorants into stops. (4) illustrates sonorant strengthening through lengthening, devoicing, or prefixation of a stop.

The argument is based on the following considerations: (1) Initial strengthening seems to be restricted to sonorants. At the same time, languages with initial sonorant strengthening tend to preserve medial sonorants without weakening; cf. e.g. (1c) and (2c). (2) Genuine initial strengthening appears to be limited to languages with independent evidence for medial obstruent weakening; cf. (1c) and (2c). (3) Apparant instances of initial obstruent strengthening, such as (5) and (6), can be explained by other scenarios. (Thus, in (5), the pattern 'medial weak': 'initial strong' is derived from earlier non-geminates with medial weakening, while the contrasting 'strong': 'initial weak' can be explained by other scenarios.)

1. Initial strengthening of intermediate and (2b).
2. Medial strengthening of intermediate and (2c).
3. PI E *wiros
4. Lac-Simon Ojibwa: (5) and (6).
5. PI E *th

Empirical evidence for a 'non-movement' analysis of the rhythm rule in English

Merle Horne
Dept. of Linguistics, U Lund

In e.g. Liberman & Prince 1977 or Selkirk 1984, the 'Rhythm Rule' is analyzed as involving a movement of 'stress'. For example, when the well-known phrase, thirteen men, is uttered out of context, one gets the impression that in the word thirteen, 'stress' shifts from the lexically stressed syllable, -teen to the syllable thi- when followed by another word with lexical stress on the first syllable, e.g. men. That is to say, the potential 'clash' that is assumed to arise when two stressed syllables lie next to each other is avoided by moving 'stress' to the left. In a number of perceptual tests and acoustic analyses of duration and fundamental frequency (F0), however, Cooper & Eady 1986 have shown that there is no empirical support for a movement analysis of the Rhythm Rule phenomena.

Another, discourse-based view of the Rhythm Rule data (Horne 1986) maintains that what causes the impressionistic effect of stress shift associated with the Rhythm Rule is simply the nonrealization of an inherent word stress as F0, on e.g. -teen in thirteen men (due to the way the focus projection rules of English apply). This stress would be realized as F0 for example, when the word is cited in isolation or focussed in a sentence, but not when movements functions as a modifier in the phrase thirteen men. The impression of stress or prominence on the first syllable, we would maintain, is an automatic consequence of the 'surfacing' of the syllabic rhythmic patterning which becomes salient in the absence of F0 prominence. As Bolinger 1981, following Bruce 1981 has pointed out, this 'syllabic rhythmic patterning' associated with duration must be distinguished from the 'accentual' (or tonal) rhythmic patterning associated with F0.

The parameter of F0 is 'stronger' than that of duration in giving the impression of stress or prominence. Syllabic (temporal) rhythmic patterning is always present, however, and is perceived most clearly in the absence of accompanying F0 movements. This tonal patterning masks the rhythmic alternations associated with syllabic duration. In short, it is syllabic rhythm (temporal patterning) that accounts for the prominence ('stress') on thirtee

1. The parameter of F0 is 'stronger' than that of duration in giving the impression of stress or prominence. Syllabic (temporal) rhythmic patterning is always present, however, and is perceived most clearly in the absence of accompanying F0 movements. This tonal patterning masks the rhythmic alternations associated with syllabic duration. In short, it is syllabic rhythm (temporal patterning) that accounts for the prominence ('stress') on thirteen men.

2. Another discourse-based view of the Rhythm Rule data (Horne 1986) maintains that what causes the impressionistic effect of stress shift associated with the Rhythm Rule is simply the nonrealization of an inherent word stress as F0, on e.g. -teen in thirteen men (due to the way the focus projection rules of English apply). This stress would be realized as F0 for example, when the word is cited in isolation or focussed in a sentence, but not when movements functions as a modifier in the phrase thirteen men. The impression of stress or prominence on the first syllable, we would maintain, is an automatic consequence of the 'surfacing' of the syllabic rhythmic patterning which becomes salient in the absence of F0 prominence. As Bolinger 1981, following Bruce 1981 has pointed out, this 'syllabic rhythmic patterning' associated with duration must be distinguished from the 'accentual' (or tonal) rhythmic patterning associated with F0.

The parameter of F0 is 'stronger' than that of duration in giving the impression of stress or prominence. Syllabic (temporal) rhythmic patterning is always present, however, and is perceived most clearly in the absence of accompanying F0 movements. This tonal patterning masks the rhythmic alternations associated with syllabic duration. In short, it is syllabic rhythm (temporal patterning) that accounts for the prominence ('stress') on thirteen men.


REFERENCES


Perceptual constraints and tonal features

David House
Dept. of Linguistics and Phonetics, Lund U

This paper examines the tonal features High, Low, Rising and Falling from a perceptual point of view using results obtained from listener tests involving perception of tonal patterns in nonsense syllables. Two questions are addressed, the first concerning the possibility of perceptual primacy of tonal levels over tonal movement and the second concerning the relationship between perception and the timing of tonal movement in terms of segment boundaries.

To compare the perception of tonal levels and tonal movement, Swedish listeners were given the task of categorizing rising-falling and falling-rising tonal patterns in a synthetic /a/ vowel. Listeners were easily able to perform the task on the basis of tonal patterns. When a /b/ gap was introduced in different places in the vowel, listeners had difficulty categorizing the same tonal patterns. Categorization strategies shifted from what could be interpreted as tonal patterns or tonal movement to tonal levels or average tone frequency. These results seem to indicate that actual pitch movement is optimally perceived during the steady-state portion of a vowel segment. When confronted with a more complex array of spectral and intensity shifts, the perceptual mechanism recodes the pitch movement in terms of levels. Pitch movement from one vowel to the next is then interpolated as a movement from one level to another. This perceptual primacy of levels over movement could explain certain aspects of universals of tone such as that reported by Maddieson (1978) where languages do not have contour tones unless they have at least one level tone. The features of High and Low would therefore be more perceptually salient and more frequent then the features Rising and Falling.

To optimally perceive the movement features Rising and Falling, the perceptual mechanism seems to require a reference tone level having a duration on the order of 30 msec at the beginning of the vowel. This synchronization between tonal movement and segmental boundaries appears to be important in languages such as Swedish and Chinese which make use of movement features. Synchronization may not be as important in languages which use the level features High and Low.

An experiment is currently under way involving American English, Swedish and Chinese listeners important in languages such as Swedish and Chinese which make use of movement features.

REFERENCES


The phonetic and phonological basis of the simplex feature hypothesis

Harry van der Hulst
RU Leiden

Recent years have shown an increased interest in simplex or single-valued features. Early motivation for simplex features was discussed by Sanders (1972). The most detailed elaboration of such a system for both vowels and consonants has been offered by proponents of Dependency Phonology (cf. Anderson & Ewen, 1987). Other proposals (mainly limited to the analysis of vowels) which differ in various ways from the DP system are offered by Schane (1984) ("particle phonology") and Kaye, Lowenstamm & Vergnaud (1985) ("government & charm theory"). Except for Sanders, the proposals mentioned differ from an SPE-type of vowel feature system not only in having single-valued rather than binary features, but also in choosing a different set of parameters for characterizing the vowel space. The SPE System uses the high-low and the front-back dimensions (with a superimposed rounding distinction), whereas most single-valued approaches use three parameters, corresponding to the three corners of the vowel triangle. The bidirectional versus tridirectional issue:

binary single-valued

bidirectional Jakobson et al., 1952 Sanders, 1972; Lars, 1984
[b+back], [r+round] [back], [round]
[h+low], [h+high] [low], [high]

tridirectional Goldsmith, 1985 Anderson & Ewen, 1987
Rennison, 1986 Kaye et al., 1985
Schane 1984
[+1], [+U], [+A] [1], [U], [A]

Essentially, a single-valued feature system represents an extreme interpretation of underspecification (Kiparsky, 1982; Archangeli, 1984; Steriade, 1987). Rather than two values being equivalent, in a binary system involving underspecification, only one value may be specified lexically, while the other is a default value. In a single-valued approach the default value is eliminated as a phonological entity, so that the feature is single-valued.

There is now a general consensus that phonological theory should either incorporate a version of underspecification theory or make use of single-valued features, but given the above, it will be clear that opinions differ with respect to the precise way in which the asymmetrical behaviour of phonological parameters is to be expressed, and with respect to the precise set of parameters. The latter issue depends not only on the usefulness of features in analyzing phonological systems and processes, but also on the possibility of providing reasonable phonetic (acoustic and articulatory) interpretations of the features.

In this report I will discuss the matters introduced briefly here and will defend a particular version of the single-valued approach. Phonological and phonetic justification will be provided for this approach to demonstrate its superiority to other single-valued frameworks. A comparison with underspecification approaches will lead to a discussion of the logical aspects of single-valued features as compared to binary features (with or without underspecification).
The paper addresses the relationship between prosodic and lexical levels of representation in a surface phonology, claiming that the key to an understanding of the interaction of these levels in phonological derivation lies in the nature and type of features employed. The features themselves reflect the particular structural motivation posited for the existence of prosodic and lexical units. While the motivation for a lexical level of representation is uncontroversial, the motivation for prosodic levels of representation has been expressed in various different ways in recent nonlinear theories (metrical, prosodic phonology). This in turn has led to a proliferation of prosodic units/categories in the literature. At the same time, other nonlinear theories (autosegmental, dependency phonology) have developed richer lexical representations themselves, which has led to a proliferation of features employed. However, as yet there has been little or no discussion on the exact alignment of prosodic and lexical representation in a phonological derivation, including the interaction of units and features from both, the tacit assumption being that this will all happen in a - largely yet to be defined - phonetic interpretation. The present paper claims that such interaction is a matter for the phonological description and argues for a surface representation in which features (and units) from prosodic and lexical levels are structurally linked in a constraining relationship.
The benefits of morphological classification: On some apparently problematic clinitics in Modern Greek

Brian D. Joseph
Ohio State U

Any theory of grammar, and more particularly any theory of the component of a grammar, the morphological component, that is concerned with words and word-like units and the places that make them up, must provide some means of classifying "elements" as to their morphological status. Of particular concern is the classification of elements into word, clitic, or affix status, for it is only by making a decision on such a classification that testable generalizations about the behavior of such units within individual languages and across different languages, i.e. universally, can emerge. Examples of such generalizations are the claim (a modified version of Hacker's Law) that sentential clinitics occur in second position within their clause and the claim that there are no endoclinics, i.e. clinics that are positioned within the morphological unit defined by a word.

Recent work by Zwicky, notably Zwicky 1985, Zwicky 1987, Zwicky & Pullum 1983 within the framework of a highly modular and restrictively interactive theory of grammar, operating for example with a monostatical phrase structure syntax, has resulted in the development of a number of criteria—all derivable from the architecture of the theory but at the same time embodying long-noted observations about morphology, e.g. that inflectional affixes close words off to derivation—that distinguish among word, clitic, and affix status for any element under examination. Among the criteria relevant here are position (interior vs. exterior), existence of phonological and semantic irregularities, type of sandhi processes exhibited by the elements, among others.

In this paper, Zwicky's criteria are applied to data from the Modern Greek verbal complex (i.e. verb plus various markers) in order to arrive at a definitive classification of clitic-like elements traditionally called "clitics" (the weak object pronouns e.g. 1SG ACC te, 1SG GEN te, 3SG ACC cm, 3SG GEN cm, etc.) and "particles" (the modal markers na and an, the future marker od, and the negation markers nai and mili), e.g. in such verbal complex expansions as:

1. [te na mu] gi've mi'... they. don't give it to me
   NEG FUT 1SG ACC 3SG ACC give/SP

2. [te an mu] gi've mi'... let them not give it to me
   MOD NEG 1SG ACC 3SG ACC give/SP

The classification of these elements to clinitics is crucial to the claims concerning clinitics noted above, for if any of the interior ones are true clinics while the exterior ones are affixes, the clinics would provide a clear case of endoclinics; similarly, if the modal or negation markers are clinics, they would constitute a counterexample to the modified Hacker's Law second-position generalization, inasmuch as their scope to demonstrably sentential.

Evidence from Standard Modern Greek, in the form of semantic and phonological irregularities, is brought in here to show that these elements are indeed neither well-behaved affixal elements. The above criteria, affixed in nature. Furthermore, dialectal evidence, in particular the occurrence of such forms as themasial (and general Northern) Greek ed-ith-eh tell me—PL (meaning you/PL tell me!), with a so-called "clitic pronoun" (—oh) inside of the plural imperative affix, and the Taconic synchronically unanalyzable negative auxiliary mri/9-m, "I am not you/PL not ...", resulting from the fusion of the negative particle with the verb 'be', serves to strengthen the conclusion reached on the basis of the standard language.

Therefore, these elements from Modern Greek, which at first glance seem so problematic to claims regarding clinitics universally, turn out, on a stringent set of classificatory criteria applied to the data, to present no problem and to be instead well-behaved affixal elements. To the extent, then, that the Zwicky criteria lead to satisfying results in dealing with these seemingly difficult facts, the analyses presented here can be said to lend considerable credence to the overall framework and approach to morphological classification advanced in Zwicky's theory, especially in comparison with the less-than-satisfying results that other proposed sets of criteria, e.g. those of Carstairs 1981 or Muysken 1981, yield in this case.


On the Interaction of theories of lexical phonology and theories of phonological phenomena

Jonathan Kaye
School of Oriental and African Studies, London

Since the dawn of generative phonology there has been an awareness of the interaction of morphological (or syntactic) structure and a variety of phonological phenomena. This awareness dates back at least to 1956 (Chomsky, Halle & Lukoff, 1956) with the postulation of the transformational cycle. Further refinements included the Principle of Strict Cyclicity (Chomsky, 1973, Kaye, 1974). More recently, the structure-phenomena interactions have been enriched by the theory of Lexical Phonology (Kiparsky, 1982, Mohanan, 1982).

This theory allows for an elaborate interplay between subsets of phonological processes and levels of morphosyntactic structure. Recent versions of Lexical Phonology make critical use of the types of phonological operations effected by rules (feature insertion vs. feature changing) and the position of such processes within the phonology (lexical vs. post-lexical).

It is obvious that such claims are problematic for the class of strictly privative phonological theories (i.e. theories which cannot "fill in" parts of phonological representations in the course of a derivation). In this paper I will try to raise the question as to the necessity of a lexical organisation that requires more than the principle of strict cyclicity. I will try to show that a number of ordering problems that emerge in Lexical Phonology disappear if different assumptions are made about segmental representations and the exact nature of the mechanisms that underlie phonological events. My conclusion is that the transformational cycle and something like the Principle of Strict Cyclicity are a necessary part of phonological theory but that any further structuring of the phonological component may not be necessary.

I will begin with a "consensus case", that is a case where divergent theories converge concerning the treatment of the phenomenon in question. This case concerns nasalisation in French. Following a suggestion by Vergnaud, 1982, Prunet, 1986 shows that French nasalisation is amenable to a cyclic treatment. Nasal vowels are analyzed as oral vowels followed by a floating nasal element. The floating nasal links to a following onset position if one is available IN THE SAME CYCLIC DOMAIN; otherwise it links to the preceding nucleus thus forming a nasal vowel. This approach explains the contrast in nasalisation between bon ami 'good friend' and sôn ami 'his friend' as well as compositional vs. non-compositional compounds: non-arrosage 'watering' ('non-arrosage) vs. non-avenu (nén-avenu). I will continue by exploring several cases (Moroccan Arabic, Japanese) that at first glance seem to call for a more complex lexical organization along the lines of Lexical Phonology. Alternative analyses will be presented.
Firthian phonology represents only part of an integrated approach to the study of language and linguistic behaviour. Firth viewed language primarily as a 'mode of action' intimately related to other modes of action engaged in by the individual as he or she interacts with others in the community.

In this, as in much of his work, Firth reacts to attitudes to the study of language that characterised his own training and that were current at the time. In building his own distinctive approach to the study and description of language Firth was very eclectic, synthesising ideas from a range of disciplines into a 'theory' that is wide-ranging and, in its own way, powerful. Partly because of this richness of its origin, and partly because of its great generality, it contains, overtly or covertly, the seeds of much of what has followed in phonology.

My discussion will emphasise the historical context of the growth of Firthian phonology and trace some aspects of its development in the hands of its originator and his disciples. In considering the theory I shall pay attention to some of its more fundamental aspects, such as the notions of 'context' and 'congruence' (i.e., with grammar); and shall play down what are more superficial (though better-known) aspects such as 'prosodies'. In addition I shall give particular consideration to areas in which the Firthian approach has seemed to some to be unworkable or capricious, those, for instance, of 'phonetic exponency' and 'polysystemicity': I shall also consider, within the limitations of time, some unresolved problems of 'system and 'structure'. This final part of the report is intended to serve as an evaluation of the extent to which the Firthian approach has a viable role to play within contemporary linguistics.

Morpheme structure rules: Redundant rules or redundancy rules?

Laury Kenton
Dept. of Linguistics, U Washington, Seattle

Although a great deal of attention has been given to placing individual phonological rules within Lexical Phonology (LP), little attention has been given to lexical constraints on possible morpheme forms. This paper seeks to rectify this omission by examining how one set of rules -- redundancy rules -- interacts with the lexicon. Data from English and a variety of other languages will be used to take a closer look at the morpheme as a domain of redundancy rules.

Morpheme structure rules (MSRs) were first proposed by Halle (1958, 1962) and Chomsky and Halle (1964). Arguments were later proposed by Archangeli (1985), 'p. 326' notes a connection between morpheme structure rules and the elimination of redundancy gradually disappeared from generative descriptions, without ever being effectively renounced as a theoretical concern.

Within LP there has been a limited resurgence of interest in redundancy, but the focus has not been on the morpheme. Kiparsky (1982) discusses lexical redundancy, but his solutions point to syllabic redundancy, rather than morphemic redundancy. Kiparsky (p. 54) argues against considering the morpheme a domain: "We do not allow rules whose domain is defined as the morpheme; minimally they must belong to level 1 and apply also to such derived forms as meet, their structural conditions."

Assuming a purely syllabic set of lexical redundancy rules accounts for the varying acceptability of forms such as brick, block, andbrick, but does not account for the restriction on place assimilation found within English morphemes. While no morpheme (whether an affix or a monomorphemic word) may end in /md/, *[...md]*... Another exception is [L..mid] does exist: screamed [L..md]

Other examples of bimorphic "exceptions" to this MSR exist, showing that its domain is in fact the morpheme, not the word, not the syllable. Further, it is not possible to appeal to a level ordered solution (e.g. the rule "shuts off" before inflection applies) since irregular forms on level 1 also show bimorphic "exceptions" to place assimilation: dream [L..mt].

Additional cases like the restrictions on alveolar and dental stops in Alur (Kenstowicz and Kisseberth 1977) and nasal harmony in Desano (Kaye 1974) also provide a strong argument for the morpheme as a domain -- as well as the reintroduction of MSRs.

This conclusion differs from more recent analyses of redundancy within LP (Kiparsky, 1986, Archangeli, 1982, Archangeli and Pulleyblank 1986) in that it proposes that there is more than one type of redundancy rule: MSRs and Syllable Structure Constraints (SSCs).

The primary consequence of adding MSRs to the model would be an additional domain of cyclic rule application. The other consequences are more subtle. By ordering MSRs before SSCs' URs would not need to be exhaustively syllabifiable. This would provide an explanation for surface canonical disparities between the outputs of MSRs and SSCs. Thus, the UR of bomb has a final mb cluster, but after the application of syllabification rules the final segment is deleted. The reintroduction of MSRs creates a new role for syllabic rules: SSCs would be able to destroy or make opaque existing PS as well as to build metrical structure. SSCs would operate as a conspiracy of rules which aligns PS to acceptable syllable structure. This argument can be extended to provide an expansion for lexical change.

Although synchronically there is little interaction between MSRs and SSCs, lexical change could occur in response to syllabic restrictions if there is no alternations which indicate a different UR than what is on the surface (e.g., compare the diachronic and synchronic URs of bomb and comb).
On the metrical structure of Japanese downstep

Haruo Kubozono
Nanzan U, Japan - U of Edinburgh, U.K.

Poser (1984) proposes the 'catathesis' model to account for the tendency of F0 contours to decline during the course of utterances in Japanese. He claims on the basis of his own experimental evidence that the pitch declination in Japanese is essentially a phonological process whereby pitch range is lowered by (word) accent, or the sequence of High-Low tones.

After demonstrating that Poser (1984)'s downstep ('catathesis') model is a largely adequate model of the downward trend in Japanese, I will show that the process of Japanese downstep involves not only the accentual/tonal aspect, which Poser has successfully explored, but also a metrical aspect which he fails to examine. To be more specific, I will show that the ups and downs of F0 contours in Japanese are heavily constrained by the syntactic configuration of the phrase or sentence, much more so than has previously been thought.

I will employ the notion of 'metrical boost' to account for the systematic effect of syntax on the configuration of downstep, and show that this notion provides a plausible account of the intonational differences which syntactically complex phrases generally show in Japanese.

Several implications emerge from the finding that downstep configurations are determined, at least in part, by the syntactic structure of the sentence. It suggests, first of all, that the intonational process of downstep serves to disambiguate otherwise ambiguous syntactic structures in Japanese. Second, and more important, it casts doubt on the traditional assumption that the syntactic information can be exhaustively 'encoded' onto intonational representation by way of a linear (or pseudo-hierarchical) intonational phrasing of utterances into intonational categories. Instead, it suggests that the intonational structure of Japanese involves a highly hierarchical organization, reflecting the syntactic hierarchy of sentences in a more direct manner than has previously been postulated.
Bengali emphatic clitics in the lexicon-syntax interface

Aditi Lahiri & Josef Bayer
Max-Planck-Institute for Psycholinguistics, Nijmegen

In Bengali, the clitic element [ stands correponds to the English even. It has remarkably interesting properties with respect to its possible attachment sites which relate to both morphological and semantic issues. Consider the following examples:

1. a. mar - i - o  "(I) even BEAT (him, her it)"
   b. mar - ch - i - o  "(I) am even BEATING (him, her)
2. a. mer - e - o - ch - i - l - an  "(I) have been even BEAT (them)
3. b. mar - ch - i - am  "(I) have been even BEATING (him, her it)

In (1), [o] can slip inside the word, but it cannot do so in (2a,b): *mar-i, *mar-o-ch-i are ungrammatical. These facts can be captured by the descriptive generalization that [o] can only attach to a phonological word, but not to stems: mer-e is the past participial form, while mar is a stem. Casting this into a framework of lexical morphology, this would mean that [o] can either attach in the syntax, or in the last stratum of the word building component in which productive inflectional affixes are attached.

Additional evidence supporting the view that mer-e forms a W, comes from degemination. Compare the following words with the progressive suffix /ch/ (where c-unasp. affix and ch-aspirated affix):

2. a. mar-ch-i b. mar-[caus]-cchi c. mer-e-chi (see gloss above)

If the affixate is always retained when following a vowel-final stem, since it can close the preceding syllable (cf. kha-chi and mar-chi), stems /kha/-/mar-/. Syllable onset consonant clusters like /cch/ are not permissible and the first C gets deleted. In (2b) the addition of causative suffix /a/ allows the first consonant of the cluster to close the preceding syllable and is thus retained - [ma-rac.chi]. However, in (2c) degemination takes place although the surface phonological melody is the same. The main difference is that resyllabification is blocked inside the W domain. The addition of the /e/ creates a W and no resyllabification can occur after the addition of an affix; the causative affix is, however, a derivational affix and its addition does not create a W thereby allowing the following suffixes to be included within the syllabification of the word, but not (as our analysis predicts) permitting the clitic /0/ to be attached to it - mar-a-cchi-o, not *mar-a-o-ch-i.

This conception leads to an apparent problem for nouns. As the examples in (3) show, [o] cannot attach before the Case-inflation:

3. a. chele "boy"
   (b) chele - ke[acc] - o  "even [to] the BOY"
   (c) chele - o- ke

One can argue that [o] fails to attach to chele in (3b) because it is a stem and does not have the domain of a W. Be that as it may, the internal structure of an N predicts that if [o] is attached before the case-affix, it would be semantically uninterpretable. Given the fact that even must ultimately obtain scope over some projection of V or INFL in order to be interpretable, a possible solution is that [o] cannot be raised out of a word in order to derive the appropriate Logical Form. Once a constituent of type [+N,-V] has to be modified, [o] can presumably only adjoin at the NP-level (cf. English even my dog vs. even my friend). Cases like (3c) would then be blocked. On the other hand, [o] would not have to undergo LF-raising in cases like (1c) because it already modifies the (semantic) head of its ultimate scope domain (cf. English John would [even BEAT] his mother and in German where particle+verb clearly form a syntactic constituent, whereas particle and noun never do).
Short vowels in Germanic

Anatoly Liberman
U Minnesota

In the late history of the Germanic languages, the most noticeable vocalic changes are so-called Great Vowel Shifts of various magnitude. English, Icelandic, and Faroese went very far in this direction; literary German is rather conservative, literary Swedish and Norwegian even more so. Changes that affected short vowels except for lengthening in certain positions, notably in open syllables, are less conspicuous and are mentioned in standard manuals in passing. However, in living dialects short vowels have been very unstable. Often they have been lowered (i > e, u > o), and often they have changed in a way that seems erratic and counterproductive for the system: for instance, in some dialects i became e, while e became i, so the system remained the same, but hundreds of words changed their pronunciation. In some German dialects lowering assumed extraordinary proportions, and i became a. A parallel change has been registered in English. In many dialects a was raised to o; old o either merged with new e or was raised to u. Thus lowering and raising went hand in hand. The delabialization of u in literary English, when viewed against this background, looks rather trivial. The short vowels of Germanic had a history reminiscent of that of the long vowels, and only the more or less regular suppression of the results of their shift by the literary languages can explain the fact that it has attracted relatively little attention. The clue to the later history of short vowels in Germanic should be sought in processes that happened much earlier but had similar consequences. In Old English and Old Icelandic one of the most prominent modifications of just short vowels was their diphthongization (breaking, velar umlaut, palatalization). The resultant short diphthongs, although monophemic and monomoric, were the locus of movable stress (godlc > yelk, godlc > yolk, etc.), as explained by the classical grammars of Germanic (Akzentumsprung). With time, the accent peak came to be fixed on either the first or the second element of the diphthong, and the unstressed element would disappear or lose its vocalic quality. For Old English, Old Icelandic, and so forth the existence of the movable peak in a plausible reconstruction, but in a number of modern dialects it can still be observed. From this point of view the German dialects in which old i and u are represented by diphthongs of the ie, uo type are to be regarded as more archaic than those in which the reflexes of i and u are e and o. The mechanism responsible for the change of short monophthongs discussed here (via short diphthongs with movable stress) should not be made to do too much work, for there must have been more ways than one of modifying the ancient short vowels. On the other hand, diphthongization of short vowels and the interplay of the variants with movable accent is not only a Germanic phenomenon: the short diphthongs of Romance developed along the same lines as their counterparts in early and late Germanic.

An acoustic study of tone sandhi in Taiwanese

Hweih-Bing Lin
Haskins Labs, New Haven, CT - Dept. of Linguistics, U Connecticut

In Taiwanese, there are five long tones: high level, high falling, mid falling, low rising, and mid level. These tones undergo sandhi changes when they do not precede a major syntactic boundary: mid level → mid falling → high falling → high level → mid level → low rising. The aim of this study was to validate these phonological observations by investigating the acoustic properties of tones in sequence. Another issue of interest was whether tonal coarticulation occurs in Taiwanese. Six native speakers produced several repetitions of the syllables /si/ and /do/ in sentence-final position with all combinations of tones. These utterances were analyzed to determine the average fundamental frequency (F0) contours of the five tones on each syllable. The tonal contours on /do/ syllables were highly similar to those observed previously in isolated syllables. Some slight perseveratory effects of the preceding /si/ tones on the F0 onset of /do/ tones were found. The tones on the penultimate syllable /si/ underwent sandhi changes, as expected. No coarticulatory effects were found on /si/ tones. However, the sandhi tones differed in their F0 contours from those on the final /do/ syllable.
Phonetic content in phonology

Bjorn Lindblom
University of Texas at Austin

How "natural" must phonological theory become to deal successfully with the problems that arise from the traditional division of labor between phoneticians and phonologists? As an example, take Anderson's critique of SPE-phonology which suffers from a "principled disregard of the substantive content of phonological expressions" (see enclosed quotations* from S.R. Anderson, 1985).

The stance that I and my colleagues take on that issue is colored by our background in experimental phonetics and the computational modeling of on-line speech processes. In highly simplified and compressed form, our reasoning goes as follows. Language is a product of biological and cultural evolution. The key explanatory concepts of evolutionary theory are variation and selection (Cavalli-Sforza, Dawkins). Therefore, a quantitative theory of linguistic variation and selection (partly phonetic) ought to provide us with the mathematical formalism we need also for relating phonetics and phonology.

I shall illustrate some of the possibilities of this paradigm using the following general point of departure: if phonological systems were seen as evolutionary adaptations to universal and socio-cultural performance factors that constrain speaking, listening and learning to speak, what would they be like? I shall discuss mainly two results. It will be shown that the substantive phonetic properties of vowel and consonant segment inventories can be more satisfactorily accounted for in terms of the proposed 'adaptationist' framework than by, for instance, notions such as implicational hierarchies and markedness (which are basically observational and therefore non-explanatory). The organizing principle seems to be inventory size. Secondly, with the aid of computational experiments I will show that the postulated performance constraints (system selection optimized with respect to perceptual distinctiveness and articulatory simplification) play a causal role in generating precursors of "quantal" structure. In other words, formal phonological properties - that is, submorphemic organization in terms of discrete "features", "segments", and "syllables" - fall out as consequences of the variation-selection model. These results are preliminary but suggest that the application of variation-selection models to phonetics and phonology is both feasible and productive.

Phonological theory generally assumes a universal set of phonological features of which each language makes use of a subset. Thus, two languages are often contrasted on the basis of the presence or absence of a feature or feature combination in the phonology of one as opposed to its absence from the other. Certain features will be commonly or universally present across languages, others are more rarely so; and the theory should reflect any structure in this cross-linguistic patterning.

The model of phonological features articulated in Clements (1985) and Sagae (1986) aims to capture generalizations of feature co-occurrence by proposing an hierarchical structure for phonological features based on articulatory phonetics; the first branch is between laryngeal and supralaryngeal features (lower branches distinguish, for example, features of manner from features of place). As far as the supralaryngeal features are concerned, our knowledge of universal patterning is considerable. We expect languages to have consistent and invariable consonants, and vowels distinguished by tongue height and/or backness, but we do not expect to find /z/ in a language which has no /s/, or contrastive rounding for a tongue height at which backness is not contrastive, and so forth.

Phonological structure characterizing variations in laryngeal activity, on the other hand, is widely presumed to vary quite drastically from one language to another. Thus, tone languages are often thought to contain a phonological (specifically, tonal) component which is simply lacking in non-tone languages, while contrastive voicing types in consonants or vowels (such as the glottal consonants of Hausa or the creaky vowels of Sodang) are taken to require features irrelevant to the phonology of languages which textually distinguish no more than voiced and voiceless consonants.

In fact, consideration of levels and domains other than that of lexical contrast indicates that the laryngeal tier may not be so impoverished. Pitch features which are specified as lingual or "tone languages" (characterizing e.g. high versus low tones, register distinctions, boundary tones and pitch alignment phenomena) are found to occur non-lexically in pitch accent systems and in tonal systems such as those of German and English. Likewise, voice quality features must be specified non-lexically in many languages, not only to characterize free variants of plain segments (e.g. ejectives in British dialects of English and implosives in American dialects) but also to describe phenomena which serve, like intonation, both affective and descriptively functions. Pre-glottalization of vowels, for example, marks syllable onsets in German, while syllable-final voiceless stops are glottally reinforced in RP English; similarly, Hausa declaratives may be distinguished from interrogatives by utterance-final vowel glottalisation.

The laryngeal tier, then, is taken to be quite fully utilized cross-linguistically: languages differ less in terms of the presence or absence of laryngeal features than in terms of the levels and domains over which they are deployed.

On Greek clitics and lexical phonology

Angeliki Malikouti-Drachman & Gaberei Drachman
U. Salzburg

1. The behaviour of the clitics in Modern Greek has been held to support controversial claims. In particular:
   a) In Kaissè 1977, 1982, 1985 the minimal clause for the Greek case is that, since vowel- hiatus between clitic-host and between clitic-non-host are handled by the same hierarchical mirror vowel-loss rule, vowel-contraction in clitic-non-host pairs requires the label "clitic".
   b) Nespor-Vogel 1982 in turn justify a prosodic domain of "clitic group" from the fact that some rules apply differently in the prosodic domains of word vs. clitic-group. For example, the voice-assimilation rule for Nespor is obligatory in word but only optional in the clitic group.

2. In this paper, apart from pointing out empirical inadequacies in these two accounts, we extend the treatment of Greek clitics in Malikouti-Drachman 1982. We show that the Greek data may be analysed within Kiparsky's 1983, BS model of Lexical Phonology without the need for further hypotheses. (cf. Bouic-Rubach 1987 for Dutch and Polish). Leaving aside the controversial issue of syntax-to-prosody mapping, we demonstrate that the rules for clitics are dispersed over the cyclic, post-cyclic & post-lexical components of the model; in each case, they also apply to non-clitic patients. Thus:
   a) A cyclic rule such as that of e-loss in the first Imperative suffix, e.g., par-te -par-te "take!" may also be triggered by addition of a clitic (par-te -> par-te "take it").
   b) Rules dealing with Nasal+Obstruent show parallel application to both clitics and prefixes, and depend on the syllabic status of the nasal when the rule applies.
   c) The resolution of vowel-hiatus constitutes two cases. That of (pre-)clitic-host is handled by a post-cyclic lexical rule, parallel to the treatment of prefixes, and not by Kaisse's hierarchical mirror rule; while for clitic plus non-host, the relevant rules are post-lexical, depend on prosodic structure, and apply also to other constituents.
   d) Following Steriade 1987 on Classical Greek, we shall suggest that the rule responsible for clitic "straus-readjustment" in Modern Greek also applies at word level. As a result, this rule is not specific to the "clitic-group".

We conclude that, so far as Modern Greek is concerned, syntactic markings are not required for external sandhi as a whole; nor does Greek support a prosodic domain "clitic group".

Angeli Malouli-Maneua Tope 4

10. The behaviour of the clitics in Modern Greek has been held to support controversial claims. In particular:
   a) In Kaissè 1977, 1982, 1985 the minimal clause for the Greek case is that, since vowel- hiatus between clitic-host and between clitic-non-host are handled by the same hierarchical mirror vowel-loss rule, vowel-contraction in clitic-non-host pairs requires the label "clitic".
   b) Nespor-Vogel 1982 in turn justify a prosodic domain of "clitic group" from the fact that some rules apply differently in the prosodic domains of word vs. clitic-group. For example, the voice-assimilation rule for Nespor is obligatory in word but only optional in the clitic group.

2. In this paper, apart from pointing out empirical inadequacies in these two accounts, we extend the treatment of Greek clitics in Malikouti-Drachman 1982. We show that the Greek data may be analysed within Kiparsky's 1983, BS model of Lexical Phonology without the need for further hypotheses. (cf. Bouic-Rubach 1987 for Dutch and Polish). Leaving aside the controversial issue of syntax-to-prosody mapping, we demonstrate that the rules for clitics are dispersed over the cyclic, post-cyclic & post-lexical components of the model; in each case, they also apply to non-clitic patients. Thus:
   a) A cyclic rule such as that of e-loss in the first Imperative suffix (e.g., par-te -par-te "take") may also be triggered by addition of a clitic (par-te -par-te "take it")
   b) Rules dealing with Nasal+Obstruent show parallel application to both clitics and prefixes, and depend on the syllabic status of the nasal when the rule applies.
   c) The resolution of vowel-hiatus constitutes two cases. That of (pre-)clitic-host is handled by a post-cyclic lexical rule, parallel to the treatment of prefixes, and not by Kaisse's hierarchical mirror rule; while for clitic plus non-host, the relevant rules are post-lexical, depend on prosodic structure, and apply also to other constituents.
   d) Following Steriade 1987 on Classical Greek, we shall suggest that the rule responsible for clitic "straus-readjustment" in Modern Greek also applies at word level. As a result, this rule is not specific to the "clitic-group".

We conclude that, so far as Modern Greek is concerned, syntactic markings are not required for external sandhi as a whole; nor does Greek support a prosodic domain "clitic group".

5. It has been often claimed that Romanian is a highly deviant Romance language, characterized by a great deal of redundancy. The explanations usually refer to the 'rustic' character of Eastern Latin and/or to Balkan or Dacian Influence. The present paper brings evidence in support of the hypothesis that the 'redundancy' in question emerged in the process of transforming various pan-Romance discourse and pragmatic strategies into parsing strategies (case markers).

Case 1: multiple object marking:
   a) by a clitic pronoun and a preposition (direct object markers):
      comp., pe tata, i-am văzut tata-i, 'preposition (pe) father-the him-acc. have-I seen yesterday', i.e., 'my father, I saw him yesterday' (cf. Fr. mon père, je l'ai vu hiler) (the clitic is a copy of the topicalized d.o.) and i-am văzut tata pe tata lit 'have-I seen yesterday PE-preposition father-the'acc.'
      b) by a clitic pronoun and a definite article (indirect object):
      comp.i-am spus mamei lit 'have-I told mother-dat. book-acc. that, clitic-'who saw him' and copulul pe care e văzut lit, 'child-the nom.-or-acc. PE-prep who-acc. him-acc.'
      c) by a clitic pronoun and an adverb (infinite article):
      comp.i-am spus, mamă lit 'have-I told mother-the the-acc.', 'I told her, to my mother (mother is the anti-topic) and i-am spus mamă lit 'I told my mother'; or spoken Rom i-am spus la mama lit 'her-dar. have-I told LU (invariable definite article - similar to preposition markers) mother-the'acc.', 'I told my mother.' In this case, the synchronic pattern remains the same, with indirect object markers may account for the use of clitics both with animates and inanimate objects...

Case 2. The development of a so-called possessive article, AL:
   comp., cartea aceea a copilului lit, 'book-the-nom.-or-acc. that A (possessive marker) child-the-genitive', 'this book of the child', and dă-i cartea aceea, a copilului lit, 'give you him-dat. book-acc.-the-acc. that, child-the-genitive- or-dative' (the possessor brings in a supplementary definite description), 'give him that book, the child's one'. In certain cases AL marks the difference between genitive and dative: comp, dă cartea aceea copilului lit, 'give the book-acc. that child-the-genitive-or-dative, i.e., he gives that book to the child' and dă cartea aceea a copilului lit 'give that book of the child'.

The deviant character of these case markers is accounted for in terms of the conflict between two diverse typological tendencies: (a) the strong tendency toward enclitic case marking, characterizing both Latin and the linguistic area where Romanian has developed, and (b) the pan-Romance preference for proclitic markers, including pre-verbal pronominal clitics.
Rule-creating creativity

Jaap van Marle
Royal Netherlands Academy of Arts and Sciences

In his contribution to the ICL-workshop on word-formation Motsch broached the time-honoured topic of the role of analogy in word-formation. I agree with Motsch that - as far as word-formation is concerned - the notion of analogy is in need of further study and reflection and the aim of this paper is to arrive at a more precise definition and demarcation of those types of word-formation that can be considered analogical. This attempt to specify the scope of analogy is based on an experimental study of Dutch derivational morphology.

In modern Dutch there is a whole series of mostly non-productive, but (both formally and semantically) highly transparent morphological categories of female personal names. The experimental study involves the feminization of those neutral personal names which lack a conventional female counterpart. On the basis of these experiments it can be concluded that - as far as derivational morphology is concerned - analogy may manifest itself in the following 3 ways:

1. the incidental actuation of existing derivational rules, i.e. the setting-up of incidental rules.
2. the rise of new derivational patterns which can be considered 'short-cuts' in the system.
3. non-derivational coining, i.e. the coining of words with the help of mechanisms which are non-additive.

Wolfgang Motsch, 'On inactivity, productivity and analogy in derivational processes'.

Morphology and word-formation in a machine-readable dictionary: problems and possibilities

Willem Mens
English Dept. Amsterdam U

The first part of this talk is devoted to a discussion of experiences with morphological information as represented in the machine-readable version of the Longman Dictionary of Contemporary English (LDOCE). These experiences arose from work in the context of two research projects funded by the Netherlands organization for pure research, 'ASCOT' and 'LINKS in the Lexicon'. The aim of the ASCOT project was the development of a comprehensive lexical data-base with an associated scanning system for context-free grammatical tagging in (semi-)automatic syntactic analysis. The aim of the LINKS project (which is still under way) is the development of an additional data-base designed to add systematic semantic information to the grammatical info provided by the ASCOT-system.

In ASCOT morphology was important both on the input and on the output side: on the input side we had to deal with a variety of ways in which morphological information was represented. Thus morphologically complex words sometimes have entries of their own, or they may be given in full as a sub-entry, or they may be represented in various truncated forms in run-on entries. On the output side we wanted to develop a morphological component that would considerably enhance the reach of the scanning system without producing an ambiguity-explosion.

In LINKS morphology loomed large when we attempted to turn the definitions into a grammatically-tagged corpus. It turned out that the so-called "controlled vocabulary" of some 2,000 words had to be multiplied on account of the many complex forms based on them. The claim that these are "easily-understood derivatives" in all cases seems ill-founded, as I will show.

On the basis of our experiences in these research projects I will then move on to a more theoretical discussion of the role morphology could play in machine-readable dictionaries, pointing out as I go along various parallels between models and proposals emanating from theoretical linguistics, experimental psycholinguistics and computational linguistics.

Bibliography

1. The term "morphology" is here throughout meant in a wide sense, to include word-formation as well.
On natural and unnatural phonology

David Michaels
U Connecticut

One of the main thrusts of "natural" phonology has been to discover the phonetic motivation for phonological processes. One of the main thrusts of "abstract" phonology has been to discover the formal principles which govern phonological rules. Can the gap between these two approaches to phonological analysis be bridged? In this paper, I will explore syllable structure theory as one such bridge. The basic idea is this: Syllabification is phonetically motivated. That is to utter a string of segments, they must be organized around sonority peaks. The sonority peaks are typically vowels. The segments which cluster about the vowels are consonants. Each sonority peak is a syllable. Each syllable can have only one sonority peak. These requirements are phonetic requirements. Tape splicing studies which cut a consonantal onset off from its following vowel render the consonant unrecognizable. Many phonological processes affecting consonants result from the specific ways in which they can be incorporated into syllables. For example, consonant deletions result automatically when consonants are left stranded, i.e. when they cannot be incorporated into a syllable (examples will be drawn from Korean, Cairene). Consonant assimilations are forced when two consonants must share a single syllable structure position (examples will be drawn from English, Zoque, Iraqi, Southern Palute). Consonant metatheses occur when the single sonority peak requirement of a syllable is threatened by a particular sequence of examples (examples will be drawn from Zoque, Cairene). Palatalization, labialization and nasalization are also forced by accommodations consonants must make to be incorporated into syllables.

Thus far, however, this is hardly a bridge between "natural" and "abstract" approaches to phonology, since it appears only to deal with phonetically driven, i.e. with the phonetic motivation for phonological rules. The other half of the bridge is built upon the lexical and syntactic constraints which limit and inform the phonetically motivated accommodations to syllabification. For example, Semitic languages are typically conservative with respect to their consonants. Consonant deletion is generally not available to resolve a problem in syllabification. Root consonants in these languages uniquely carry the lexical content of the word or morpheme. To delete a root consonant in Iraqi or Cairene is akin to non-recoverable deletion in syntax. Syllabic accommodations in Semitic languages are made through vowel epenthesis rather than consonant deletion. The syllabic accommodation is phonetically driven. Then, the fact that it is done by epenthesis rather than deletion is lexically driven. Similar lexical and syntactic conditions on phonetic accommodations to syllabification will be illustrated for processes as diverse as Germanic umlaut and Sanskrit deaspiration.

In this paper I will examine the pitfalls to "natural" phonology of looking only in the direction of phonetic explanation for phonological processes, and the pitfalls to "abstract" phonology of overly powerful and inherently nonexplanatory rule systems. I will suggest how these pitfalls can be avoided by a phonetically motivated set of organizing principles on the one hand, and a suitably restricted rule system on the other. Finally, I will illustrate the basic arguments of the paper with examples of relevant phenomena drawn from a variety of languages.

Exonence models for inflection normally postulate that the phonological representation of each inflected form of a lexical item is drawn from a lexical base and a grammatical representation - often represented as a bundle of morphosyntactic features. Some inflectional processes, as Matthews (1972:86) observes, may "derive a 'view' from another 'view' of identical status" (the emphasis is mine, e.g., in Latin "the stem of the Future Participle is derived from the stem of the Past Participie by the suffixation of uo". This means that a grammatical representation [+F2] which does not contain a certain bundle of features [+F1] may nevertheless trigger the rules of expression for [+F1]. Matthews (1972:176-183) suggests a formal mechanism of parasitic formation - a loop in the derivation - which at one point alters [+F1] so as to add the feature [+F2].

Although not specifically discussed, such parasitic formations are also required in recent exponents models (Anderson 1977, 1982; Zwicky 1984, 1979). In particular, I examine the case of Narais Venda French, where, e.g., pl pres. subj. ([n556e]y) "vee clean" and pl past subj. ([n555g0]) have the same underlying morphemes: stem /n5do], subj. /y/ and pl. /i/; pl pres. subj. is derived from the tag pres. subj. ([n565e]y) /n5550/ where /y/ is regularly realized (tw) before consonant in word-final position and pl past subj. is directly derived from /n550+/i5/.

I propose that parasitic formations are specific instances of a morphological relationship corresponding to conversons in derivational morphology. Inflectional conversion generalizes the concept of suffixes or nominals introduced by Zwicky. This proposal, furthermore, widens the scope of inflectional morphology. It not only accounts for derivation of inflected forms of a given lexical item but also for the direct relationship between some of them. The distinction between lexicon-internal (as in Lieber 1980), parasitic inflection becomes less significant, as many exponents rules may be reinterpreted as inflectional conversion rules which introduce new selectional rules.

Problems of word structure theories

What are the principles underlying properties of word structure? This well-known question from the history of linguistics is one of the central problems in recent linguistic research. In the current framework of Generative Grammar people have tried to find out the most general description of the relations between properties of word structure and properties of other types of grammatical structure and to determine this description by universal grammatical principles. Many different theoretical approaches have been elaborated. In this paper the interest is restricted to the word-formation aspect of word structure. As to this aspect, two contradictory hypotheses play an important role in recent discussion: Word structure is defined by autonomous rules and principles (SELKIRK, LIEBER) vs. word structure is simply a specific instance of more general syntactic principles (ROEPER, SPROAT, TOMAN). In any case, a sufficiently elaborated hypothesis on the form of word structure rules must be available. We may take the proposals by SELKIRK, LIEBER, TOMAN as a starting point. Following them word structure rules are rewriting rules of roughly the form

\[ X \rightarrow YX \]

where further restrictions have to be included. In this paper two problems arising with rules of this type will be discussed:

1. The rule schema mentioned above may be more or less specified by particular restrictions or modifications. One implication, however, seems to be inevitable: affixes have to be analyzed as lexical entries having a particular phonological shape and particular syntactic and semantic properties. This, in turn, means that only derivational processes involving affixes can be considered to be determined by principles of universal grammar. It is, however, well-known that derivational processes involving affixes can be considered to be determined by restrictions in the periphery of a grammar. A theory of markedness, however, is a necessary complement to a theory of universal grammar.

2. The second problem to be discussed will be the reliance of word structure rules on X-bar-theory.
The apparently necessary distinction in Polish between palatalizing and non-palatalizing, and between fleeting and non-fleeting vowels (mostly \[e\]'s, as in \[p'es\] - \[ps\], vs. \[bcs\] - \[bz\], \[t\] - \[t\], \[ts\] - \[ts\], vs. \[t\] - \[t\], \[ts\] - \[ts\]) has for years legitimized a diachronic element in the insight into Slavic phonology, expressed in the rule of absolute neutralization evoking the historic front and back years. The rule called LOWER (Gussmann 1978,1980) deletes the last occurrences of years in a sequence, and vocalizes the preceding ones as \[e\], not only absolutely neutralizing the tense-lax contrast, but also obviating the original front-back distinction, and thus neatly accounting for the asymmetry between vowel quality and the triggering of rules depending on it.

The concept of representations worked out by autosegmental phonology translates absolute neutralization into a radically different format of abstractness, independently stipulated and making different claims about the sound structure. Spencer (1986) advocates empty V-slots in place of years, and redundancy rules in the spirit of Archangeli's (1984) theory of underspecification, which fill in the slots with remaining feature values, ignoring diacritically marked final empty years in a string. This solution crucially makes use of the deletion rule by encoding the occurrences of the alternating vowels in UR's, and is therefore a reformulation of the previous analyses, only expressed in the new language and still retaining a fair measure of redundancy.

Following Laskowski (1975), Gussmann (1978) showed convincingly that the epenthesis rule for Polish is unworkable on the premise that Polish syllable structure is largely unpredictable. At a closer inspection, Polish syllable structure seems to observe many regularities including Sonority Hierarchy despite many surface exceptions; and if we accept the concept of syllable adjuncts, unsyllabified segments, and underlying or prespecified syllable structure, no special rule is necessary for Polish, since the “irregular” vowels will be inserted by a rule of epenthesis falling directly out from the rules of syllabification maximizing syllable structure and minimizing unsyllabified segments. In other words, syllable structure considerations in a non-linear framework bring back the V-epenthesis solution for Polish and remove the problem of absolute neutralization.

References
Automatic morphological analysis of agglutinative languages

Gábor Prószéky
Hungarian Academy of Sciences, Budapest

Phonology and speech perception: The case of nasal stops

Daniel Recasens & Josep Martí
Universitat Autònoma de Barcelona - Escola Universitaria d'Enginyers Tècnics de Telecomunicacions, Barcelona

It is widely believed that a more appropriate understanding of the constraints on the production and perception of phonemes in running speech will shed light on the mechanisms underlying the processes of sound change and phonological acquisition. The following factors appear to be determining in this respect:

(a) The contextual position in the syllable. Thus, some C segments (e.g., oral stops) are more resistant to sound change in syllable onset vs syllable coda position, presumably because the acoustic discontinuity between C and V in CV structures is more salient than that between V and C in VC structures.

(b) The distinctiveness of the acoustic cues. Thus, /b/ and /ɡ/ are often confused when adjacent to back rounded vowels, most probably due to the fact that sequences such as [bu] and [gu], [bo] and [go] show flat and highly similar F2 transitions.

In the first place, this paper will investigate the relevance of factors (a) and (b) in the perceptual identification of nasal stops of different place of articulation. Recent papers (Kuwowski and Blumstein, 1984; Repp, 1986) investigate the contribution of vowel transitions and nasal murmurs in the process of place identification for word-initial /m/ and /n/ in English CV sequences. Focusing on the study of VC structures, we will seek to complement Repp's (vs Kurowski and Blumstein's) findings according to which the murmur and the vowel transitions form a single integrated property in the perceptual system but not in the auditory system. Thus, place identification depends on spectral changes over time during vowel transitions and consonantal murmurs, rather than on the spectral characteristics around the release of the nasal consonant.

Waveform-editing procedures have been performed to investigate the perceptual contribution of the following cues to the identification of final unreleased /m/, /n/ and /r/ in Catalan VC sequences: (a) V transitions; (b) C murmurs; (c) excerpts sampled at the VC discontinuity, containing a few final glottal pulses of the V transitions and a few initial glottal pulses of the C murmur. Consonants were preceded by vowels /i/, /a/ and /u/ to study the context-dependent mechanisms used by listeners for consonantal place identification.

Secondly, it will be shown that certain phonological processes affecting nasal stops in CV and VC syllable structures can be explained in terms of the relative power of perceptual cues (i.e., vowel transitions and consonantal murmurs). We believe this to be a good example of empirical methods in phonology.


Areal features and diachronic phonetic universals

Jorgen Rischel
U Copenhagen

I shall here address the question to what extent it is appropriate to search for universal phonetic / phonological explanations in the case of phenomena that are more or less "areal" in their occurrence. By an areal diachronic feature I understand a feature of linguistic change that is typically observed in languages clustering within a very limited region of the world. The possibility of explaining sound change in terms of mechanisms inherent in the acquisition and use of language has been recognized for more than a century and a half (Bredsdorff, 1821). Some recent contributions focus on the mechanism of phonological restructuring as a component of language acquisition, in particular the role played by abduction (H. Andersen); others go more into the phonetics. Ideally, it should be possible to define the universal principles underlying "preferred" types of sound change (cf. Grammont), although the explanatory force of diachronic linguistic universals has recently been put into serious doubt by R. Lass. John Ohala in several papers has attempted to show that some widespread phenomena of some kind often crucially enters the total, complex explanation. Toneogenesis of the type trading syllable initial consonant distinctions for tones is (since Halleff, 1972) often taken to be a clear-cut example of sound change dependent on a universal phonetic principle. Such toneogenesis is explained with reference to the apparent universal tendency for initial voiced and voiceless stops to influence pitch in different ways (the pitch starting lower after a voiced than after a voiceless stop).

However, it is not that simple, since: (1) phoneticians still do not have a good explanation of the pitch perturbation occurring in CV-sequences (2) the degree of perturbation seems to be somewhat language-specific; (3) the diachronic change mostly occurs as tone split rather than genesis of a "tone language"; (4) languages / dialects assumed to have undergone it very often fail to show the expected "voiced-low, voiceless-high"-correlation. In this paper I shall go somewhat into detail with tonogenesis in order to argue that a phenomenon of this kind will probably defy serious explanation unless we recognize the fact that it is first and foremost an areal feature (in cases featuring for instance Southeast Asia rather than any other region). Thus there are two explicanda: (i) where and by what mechanism did such tonogenesis arise, and (ii) what mechanisms are involved in the spreading of such a feature to other, maybe even unrelated languages. The situation may be similar when trying to give a diachronic explanation of other phenomena that (seem to) involve coarticulation / assimilation, such as vowel harmony, for example.

Constraints on extrametricality

Iggy Roca
U Essex, Colchester, England

Local deviations from the output of metrical algorithms are standardly encapsulated through the device of "extrametricality" (Halle 1977, Liberman and Prince 1977, Hayes 1980, 1982, etc), the adequacy of which has been corroborated by a sizable body of descriptive successes (Hayes 1980, Halle and Vergnaud 1987, etc.), primarily in the area of stress, from which it has been extended to account for cases of vowel deletion (Rappaport 1984) and other phenomena involving counting (vd. Halle and Vergnaud 1987).

While agreement would undoubtedly be forthcoming from all quarters that any such intervention must be constrained to avert arbitrariness, the treatment of extrametricality in the literature has failed to achieve uniformity, and the tenets subscribed to by different authors have often remained unstated.

A proper treatment of extrametricality requires the explicit formulation of the following parameters: type of domain, type of bearing unit, member of bearing units, location of bearing unit(s), relationship between trigger and target. After briefly stating what is assumed to be the standard setting for the remaining parameters, this paper addresses the issue of the identity of the extrametricality bearer by focussing on the double use to which the device has been put, i.e. as a corrector of the domain of the stress algorithm and as a corrector of syllable weight, in the case of quantity-sensitive systems. Such an ambiguous practice will be shown to be equivalent to affording a moraic interpretation to the extrametricality bearers, and consequently to be unworkable. A viable alternative formalisation of the attested interaction between extrametricality and syllable quantity lies in the autosegmentalisation of extrametricality. Specifically, the peripherality-abiding extrametricality mark can be borne either independently by stress bearers (Latin, English nouns) and segments (English verbs), or simultaneously by both (Sumaic Arabic), in which case stress extrametricality can be quantity-sensitive.

It is the claim of this paper that the assignment of the two modes of operation of the device to different autosegmental planes further constrains its power, thus leading to the establishment of a principled extrametricality theory.
The representation of prenasalized consonants

Samuel Rosenthall
McGill U

This paper proposes that prenasalized consonants are represented in the feature hierarchy framework of Clements (1985) as two root nodes dominated by one skeletal point. Furthermore, this paper proposes that [+son] along with [-nasal] (from Piggott, 1987) are linked directly to the root node. The features [+cont] and [-strident] link directly to the suprasegmental node.

(1) prenasalized consonants:

According to Sagey (1986), prenasalized consonants are represented as one root node and the features [+nasal] and [-nasal] are linked to the 'soft palate' node which is dominated by the s-lar node. Sagey hypothesizes that contour segments, i.e., segments where [+F0] and [-F0] are dominated by the same root node, cannot be represented by branching class nodes.

This paper claims Sagey's hypothesis cannot be correct. Sagey considers prenasalization to be simply the addition of nasalization to the consonant. If this is the case, then it is not possible to account for the alternation between Nasal-Stop (N-S) sequences and prenasalized consonants in Sinhalese (Feinstein, 1979). Since prenasalized consonants in Sinhalese are underlyingly N-S sequences, then the nasal must be considered as an independent set of features and nodes. Furthermore, nasal prefixes in African languages also must be considered as an independent set of nodes (particularly the root node) and features because only a particular nasal surface when prenasalization does not occur, i.e., when the nasal is followed by a vowel. For example /g/ precedes a vowel in Ndali (Vail, 1972) where prenasalization is expected. The independent root node is required regardless of whether the features for /g/ are lexical or the result of default insertion rules.

The nasal and oral segment of a prenasalized consonant always agree for place, voice, and continuancy. These agreements follow from the representation based on the feature geometry proposed here: the nasal and the oral segment must share all nodes below the root node. This paper also proposes that affricates are represented as branching s-lar nodes but only one place node. The similarity between the structure of prenasalized consonants and affricates is captured by the condition on representation given in (2).

(2) Given class nodes A,B,C, in the domain of a syllable, where B, C on tier T are linked to and dominated by A, then all class nodes dominated by B,C must be linked to B,C.

Labio-velar stops, however, are represented as one place node, as proposed by Sagey. Since the articulator nodes are naturally distinct from class nodes, then (2) does not apply. Condition (2) accounts for the phenomena that occur in environments where prenasalization is expected.

(3) Ndali (Vail, 1972)

This paper presents nasal deletion as redundantly specified as [+voice] and [-cont]. Since Ndali stops are [+voice] only post-nasally, then stops are not lexically specified for [voice]. Similarly, since /h/ is the only voiceless fricative in Ndali, then it need not be specified for [voice]. Post-nasal hardening and voicing result from the spreading of the laryngeal and s-lar node, respectively, from the nasal to the obstruent. Place assimilation results from the spreading of the obstruent's place node to the nasal. The mechanics of place node assimilation will be discussed. Primitives such as /h/ are lexically specified as [+cont] hence the nasal cannot spread its s-lar features. In this case, (2) is not satisfied, therefore no prenasalized consonant can be formed. Violations of (2) are resolved by prohibiting the linking of the nasal's root node to the skeletal point dominating the fricative, hence nasal deletion.

Sagey's representation of prenasalized consonants cannot account for the range of phenomena that occur in prenasalization environments. These phenomena are accounted for here by the interaction of underspecification, the proposed feature geometry, and the condition on representation.


How syntax becomes morphology

Mario Saltarelli
USC

The general aim of this paper is to define the mechanism which accounts, on a principled basis, for the variation resulting from categorial shift through time. An instance of this diachronic phenomenon is the restructuring of the pronominal system in the Latin-Romance time continuum from a Nominal to an Inflectional category: (1) > (2). Notice, furthermore, the significant order of synchronal variation and degree of functional specification between the present-day pronominal system of (Standard) Italian and (Etymological) Spanish: (2) a-b.

(1) Latin

| (2) Romance |
|---|---|
| Case | Inflection |
| N | (a) (a) |
| DAT ACC | DAT ACC |
| mihi me | mi se |
| te ti to |
| sibi se si se |
| illi illum gli lo *sgli/1lu |
| *tile *till *le la cilla |

| (2) (a) Italian |
|---|---|
| (2) (b) Spanish |
| me mf |
| te tf |
| se sf |
| le lo él |
| la lla |

It must be assumed that the mechanism responsible for the variation in Romance is already present in Latin. In fact the Latin personal pronoun system is ambicategorial, in that it is in the process of incorporating in the gender-less Indo-European mihi/tibi/sibi the gender-marking Latin demonstrative illi/illae (Kent 1946). A characterization of the principle operating in categorial shift is proposed in (3).

(3) The number of morpheme alternants for a category C is equivalent to the number of its values.

Thus (3) accounts for the limited occurrence of the forms illae in Latin as well as for the gender syncretism in the Spanish dative le and in (popular) Italian gli. I will show that the phenomena of losano, losano and losano in Spanish also follow from principle (3) as an instance of case syncretism. Finally, it will be argued that the polar redistribution in the reflexes of the Latin case contrast mihi/me observed in the Romance morphemic contrast mi/mi (cf.2av2b) constitute remarkable evidence of the constraints placed by (3) on the categorial shift in question. In addition to their relevance for a theory of variation, these results shed new light on the origin of clitics in Romance as a consequence of categorial shift and on the debated definition of their category (Kayne 1975, Jaeggli 1982, Borer 1984).
Productivity, inflection and derivation

Sergio Scallise
U Venice

Productivity has been said to be a too doubtful criterion to be used in distinguishing between Inflection and Derivation. For example, Bybee (1985:84) maintains that since -ly in English is fully productive it could be considered an inflectional morpheme. On the other hand, Anderson (1982:585) claims that "certain derivational processes are apparently completely productive". For example, Anderson says that "some action nominal formation is available for every [e.m.] verb (subject only to semantic limitations)."

In this communication I will take seriously both claims. First, I will analyze the Italian suffix -mente (assuming that its distribution is not very different from -ly) and I will show that this suffix is not fully productive as it is commonly believed to be (cfr. also Bauer 1983: 225).

Secondly, I will analyze nominalizations in Italian and I will show that also in this case the process is not fully productive. On the contrary, also nominalizations (taken as an unitarian process of suffixation) make a lot of very subtle distinctions.

In both cases, furthermore, it can be shown that the analysis that the suffixes in question make of their bases is very complex, in a way which is not typical of inflection. For example, a) it seems that inflectional morphemes and derivational suffixes behave very differently to the presence of a prefix, and b) derivational suffixes are sensitive to a number of semantic restrictions that usually do not bother inflectional morphemes.

The morphological acquisition of regular vs. irregular paradigms: Plural vs. comparative in German

Chris Schaner-Wolles
Dept. of Linguistics, U Vienna

This paper presents an investigation on the acquisition of plural and comparative morphology in German. Forty children aged 2:3 till 6:6 were tested with a set of sentence completion tasks in order to determine the degree of mastering the morphological patterns. It became obvious that the acquisition of morphology proceeds along the dimension of regular vs. irregular processes. The comparative paradigm, which is simple and regular in German, is mastered at the age of five while the plural, a complex and irregular paradigm, proves to be difficult even at the age of six. Viewed from the perspective of cognitive development, it is remarkable that the acquisition of a formation type antedates the development of the corresponding cognitive category in the case of comparison. If this is interpreted as evidence for an autonomous linguistic development, it is evidence against the hypothesis of cognitive correlation.
"Voiced aspirated" or "breathy voiced" and the case for articulatory phonology

Leselotte Schiefer
Institut für Phonetik und Sprachliche Kommunikation, U München

Most of the Indo-Aryan languages make linguistic use of four stop classes: voiceless unaspirated (or short lag stop), voiceless aspirated (or long lag stop), voiced (or lead stop), and "voiced aspirated". Whereas there has long been agreement about the nature of the first three categories, there is still confusion about the appropriate term for the fourth category (cf. DIXIT, Proc. ICPhS, Vol. 2, pp. 145-148), the terms ranging from "voiced aspirated", the traditional term, to "breathy voiced", "murmured" and "phono-aspirated". In this paper we will contribute to this dispute by adding some physiological, acoustical, and perceptual details.

A CV syllable, where C is one of the "voiced aspirates" of Hindi, usually consists of four acoustical portions: (i) voicing lead prevoicing during the articulatory closure of the stop, (ii) the release burst of the stop, (iii) a periodic portion mixed with turbulent noise, and (iv) a steady vowel portion. Those authors, who favor the concept of "voiced aspirates" regard prevoicing as comparable with regular voiced phonation in voiced stop cognates and the noisy portion as regular voiced (or voiceless) "aspiration".

As to our knowledge there are no details available about the spectral structure of the noisy portion, we will thus present data from one speaker of Hindi, which show, that it is mistaken to regard the noisy portion as "aspiration" as it shows regular vowel formant frequencies and should be correctly referred to as the breathy part of the vowel. Perceptual results, which will be presented, confirm that prevoicing and the breathy vowel portion are not treated independently by the listener. They are perceived as one indivisible glottal gesture underlying breathy phonation.

We will discuss the acoustical, perceptual, and physiological data with respect to an appropriate terminology of the fourth stop category in Hindi, as well as their implications for an articulatory phonology (Brown & Goldstein, 1986).
On a universal criterion of rule coherence

Michael Shapiro
New York

One of the factors that commonly retard progress in linguistic theory is a kind of amnesia affecting its practitioners, whereby well-grounded, highly procedural principles of language structure discovered in the past are forgotten in contemporary discussions. The principle of isomorphism has, alas, suffered from just such neglect, with predictable consequences. In its simplest form this principle states that different levels of language structure embody identical rules of organization. The first explicit application of this principle was made by Jakobson in 1932 (in his analysis of the Russian verb system), and the first significant recognition of the pervasiveness of isomorphism between the different levels of language was achieved by Hjelmslev in 1938 in his 'Essai d’une théorie des morphèmes'. One of the consequences of the discovery of the isomorphism principle was a shift in the understanding of linguistic arbitrariness (associated chiefly with Saussure). Due largely to Jakobson's studies after the war, it became more and more clear that the core of language is constituted by extensive patterns of similarity and difference among the shapes of grammatical morphemes which correspond to relations of similarity and difference among their meanings. In semantic terms such correspondences between relations on the expression and the content levels are to be understood as diagrams (relations represented by relations). In recent discussions (to the limited extent that this idea is mentioned), mapping relations of this sort have come under the designation of 'iconicity' in grammar.

There is another sense in which isomorphism can be said to pervade the structure of language, and that is the sense in which coherence can be said to be characteristic of linguistic rules at the core of grammar. Although the idea of rule was not prominent among the theoretical advances of the early European structuralists, it is nonetheless clear that its ubiquity today owes much to an understanding of grammatical relations as patterning and regularity that goes back to prewar discussions of the foundations of linguistic theory. What is missing from both pre- and post-war theorizing, however, is the notion of the coherence of linguistic relations, and as a corollary, the means whereby coherence is to be expressed in the practice of linguistic description. All along, the potential for making coherence an explicit principle in the understanding of language structure existed among the many overt achievements of early structuralism, namely in the idea of rule was not prominent among the theoretical advances of the early European structuralists, it is nonetheless clear that its ubiquity today owes much to an understanding of grammatical relations as patterning and regularity that goes back to prewar discussions of the foundations of linguistic theory. What is missing from both pre- and post-war theorizing, however, is the notion of the coherence of linguistic relations, and as a corollary, the means whereby coherence is to be expressed in the practice of linguistic description. All along, the potential for making coherence an explicit principle in the understanding of language structure existed among the many overt achievements of early structuralism, namely in the idea of rule was not prominent among the theoretical advances of the early European structuralists, it is nonetheless clear that its ubiquity today owes much to an understanding of grammatical relations as patterning and regularity that goes back to prewar discussions of the foundations of linguistic theory. What is missing from both pre- and post-war theorizing, however, is the notion of the coherence of linguistic relations, and as a corollary, the means whereby coherence is to be expressed in the practice of linguistic description. All along, the potential for making coherence an explicit principle in the understanding of language structure existed among the many overt achievements of early structuralism, namely in the idea of rule was not prominent among the theoretical advances of the early European structuralists, it is nonetheless clear that its ubiquity today owes much to an understanding of grammatical relations as patterning and regularity that goes back to prewar discussions of the foundations of linguistic theory. What is missing from both pre- and post-war theorizing, however, is the notion of the coherence of linguistic relations, and as a corollary, the means whereby coherence is to be expressed in the practice of linguistic description. All along, the potential for making coherence an explicit principle in the understanding of language structure existed among the many overt achievements of early structuralism, namely in the idea of rule was not prominent among the theoretical advances of the early European structuralists, it is nonetheless clear that its ubiquity today owes much to an understanding of grammatical relations as patterning and regularity that goes back to prewar discussions of the foundations of linguistic theory. What is missing from both pre- and post-war theorizing, however, is the notion of the coherence of linguistic relations, and as a corollary, the means whereby coherence is to be expressed in the practice of linguistic description. All along, the potential for making coherence an explicit principle in the understanding of language structure existed among the many overt achievements of early structuralism, namely in the idea of rule was not prominent among the theoretical advances of the early European structuralists, it is nonetheless clear that its ubiquity today owes much to an understanding of grammatical relations as patterning and regularity that goes back to prewar discussions of the foundations of linguistic theory. What is missing from both pre- and post-war theorizing, however, is the notion of the coherence of linguistic relations, and as a corollary, the means whereby coherence is to be expressed in the practice of linguistic description. All along, the potential for making coherence an explicit principle in the understanding of language structure existed among the many overt achievements of early structuralism, namely in the idea of rule was not prominent among the theoretical advances of the early European structuralists, it is nonetheless clear that its ubiquity today owes much to an understanding of grammatical relations as patterning and regularity that goes back to prewar discussions of the foundations of linguistic theory. What is missing from both pre- and post-war theorizing, however, is the notion of the coherence of linguistic relations, and as a corollary, the means whereby coherence is to be expressed in the practice of linguistic description. All along, the potential for making coherence an explicit principle in the understanding of language structure existed among the many overt achievements of early structuralism, namely in the idea of rule was not prominent among the theoretical advances of the early European structuralists, it is nonetheless clear that its ubiquity today owes much to an understanding of grammatical relations as patterning and regularity that goes back to prewar discussions of the foundations of linguistic theory. What is missing from both pre- and post-war theorizing, however, is the notion of the coherence of linguistic relations, and as a corollary, the means whereby coherence is to be expressed in the practice of linguistic description. All along, the potential for making coherence an explicit principle in the understanding of language structure existed among the many overt achievements of early structuralism, namely in the idea of rule was not prominent among the theoretical advances of the early European structuralists, it is nonetheless clear that its ubiquity today owes much to an understanding of grammatical relations as patterning and regularity that goes back to prewar discussions of the foundations of linguistic theory. What is missing from both pre- and post-war theorizing, however, is the notion of the coherence of linguistic relations, and as a corollary, the means whereby coherence is to be expressed in the practice of linguistic description. All along, the potential for making coherence an explicit principle in the understanding of language structure existed among the many overt achievements of early structuralism, namely in the idea of rule was not prominent among the theoretical advances of the early European structuralists, it is nonetheless clear that its ubiquity today owes much to an understanding of grammatical relations as patterning and regularity that goes back to prewar discussions of the foundations of linguistic theory. What is missing from both pre- and post-war theorizing, however, is the notion of the coherence of linguistic relations, and as a corollary, the means whereby coherence is to be expressed in the practice of linguistic description. All along, the potential for making coherence an explicit principle in the understanding of language structure existed among the many overt achievements of early structuralism, namely in the idea of rule was not prominent among the theoretical advances of the early European structuralists, it is nonetheless clear that its ubiquity today owes much to an understanding of grammatical relations as patterning and regularity that goes back to prewar discussions of the foundations of linguistic theory. What is missing from both pre- and post-war theorizing, however, is the notion of the coherence of linguistic relations, and as a corollary, the means whereby coherence is to be expressed in the practice of linguistic description. All along, the potential for making coherence an explicit principle in the understanding of language structure existed among the many overt achievements of early structuralism, namely in the idea of rule was not prominent among the theoretical advances of the early European structuralists, it is nonetheless clear that its ubiquity today owes much to an understanding of grammatical relations as patterning and regularity that goes back to prewar discussions of the foundations of linguistic theory. What is missing from both pre- and post-war theorizing, however, is the notion of the coherence of linguistic relations, and as a corollary, the means whereby coherence is to be expressed in the practice of linguistic description. All along, the potential for making coherence an explicit principle in the understanding of language structure existed among the many overt achievements of early structuralism, namely in the idea of rule was not prominent among the theoretical advances of the early European structuralists, it is nonetheless clear that its ubiquity today owes much to an understanding of grammatical relations as patterning and regularity that goes back to prewar discussions of the foundations of linguistic theory. What is missing from both pre- and post-war theorizing, however, is the notion of the coherence of linguistic relations, and as a corollary, the means whereby coherence is to be expressed in the practice of linguistic description. All along, the potential for making coherence an explicit principle in the understanding of language structure existed among the many overt achievements of early structuralism, namely in the idea of rule was not prominent among the theoretical advances of the early European structuralists, it is nonetheless clear that its ubiquity today owes much to an understanding of grammatical relations as patterning and regularity that goes back to prewar discussions of the foundations of linguistic theory. What is missing from both pre- and post-war theorizing, however, is the notion of the coherence of linguistic relations, and as a corollary, the means whereby coherence is to be expressed in the practice of linguistic description. All along, the potential for making coherence an explicit principle in the understanding of language structure existed among the many overt achievements of early structuralism, namely in the idea of rule was not prominent among the theoretical advances of the early European structuralists, it is nonetheless clear that its ubiquity today owes much to an understanding of grammatical relations as patterning and regularity that goes back to prewar discussions of the foundations of linguistic theory. What is missing from both pre- and post-war theorizing, however, is the notion of the coherence of linguistic relations, and as a corollary, the means whereby coherence is to be expressed in the practice of linguistic description. All along, the potential for making coherence an explicit principle in the understanding of language structure existed among the many overt achievements of early structuralism, namely in the idea of rule was not prominent among the theoretical advances of the early European structuralists, it is nonetheless clear that its ubiquity today owes much to an understanding of grammatical relations as patterning and regularity that goes back to prewar discussions of the foundations of linguistic theory. What is missing from both pre- and post-war theorizing, however, is the notion of the coherence of linguistic relations, and as a corollary, the means whereby coherence is to be expressed in the practice of linguistic description. All along, the potential for making coherence an explicit principle in the understanding of language structure existed among the many overt achievements of early structuralism, namely
In this paper arguments for using external evidence in phonological study are presented. First, the theoretical advantages of using external evidence to formulate and contrast phonological hypotheses are considered and, second, different types of evidence are studied and it is shown how they can contribute to formulate and contrast phonological explanations. The analysis is illustrated with a sound change that has phonological and morphological consequences: the rhotization of [z], generally known as rhotacism. Different types of historical and dialectal evidence of the rhotacism of -z- in Indo-European and non Indo-European languages are studied. Rhotacism is shown to be a common and recurrent phenomenon occurring in different periods an unrelated languages. This fact indicates that rhotacism is probably due to an articulatory, acoustic or auditory constraint that all speakers share. An explanation of rhotacism in articulatory and perceptual terms is provided. If rhotacism is due to such hardware constraints it should show up in different areas of the language. Different occurrences of rhotacism in children’s acquisition of phonology, non-standard pronunciations and experimental evidence are studied.
Morpholexical phonology

Andrew Spencer
Geneva

Unlike syntactic structure, which can be seen as the result of the interaction of general principles parametrized in finite ways, morphophonology is regarded as the result of the operation of language-particular rules. Assuming a distinction between cyclic lexical, post-cyclic lexical, and post-lexical (phrase level) rules, this paper argues that the cyclic rules should be regarded as morpholexical rules in the sense of Lieber (1980), i.e., redundancy rules relating listed allomorphs. It is shown that this characterization is sufficient: the main problem with previous "morpheme alternant" theories is that it is necessary to distinguish a basic or underlying form. Given underspecification theory the base form is the Elsewhere Case, not marked to undergo any diacritically triggered structure-building rule. The basic difference is then that morpholexical rules produce their output before morphological concatenation, while phonological rules do so after the morphology. Where necessary, allomorphs are then provided with features indicating what other types of formative they can concatenate with. Except for the device of rule ordering, this resulting system is a notational variant of Lexical Phonology with respect to weak generative capacity. The morpholexical system predicts that only Feeding and Bleeding orders will be found, other orders being the result of interaction of the three different components. The morpholexical theory is empirically necessary because there are morphological concatenation rules which have to make crucial reference to the phonological form of non-basic alternants even before the 1st cycle. The theory is conceptually necessary because the derivational alternatives are unlearnable and fail to account for typological differences between related languages. Moreover, in the morpholexical theory, Strict Cyclicity and Structure Preservation are both automatic consequences, and don't need to be stipulated. (I assume these hold of the cyclic but not necessarily the post-cyclic lexical component). The morpholexical theory can be seen as a kind of "principles and parameters" approach: different parameter settings produce different underlying phoneme inventories, and different morpheme structure conditions. Even assuming that allomorph selection under-morpheme concatenation is strictly local, further (slight) variation may be induced by parametrizing phonological conditions on concatenation e.g., a language may allow allomorph selection to refer to adjacent rhyme projections or syllable tiers rather than just adjacent segments. Morphophonemic rules re-stated as morpholexical rules can be readily abduced from primary data, since there is no extrinsic rule ordering to compute. Moreover, since segment structure redundancy rules may be post-cyclic (cf. Archangeli) it is possible to capture generalizations by appeal to 'abstract' underlying segments without these posing a serious learnability problem.

Between separation and integration

Jolanta Szpyra
Maria Curie-Sklodowska U, Lublin

Within the generative framework two major proposals have been put forward to handle the interaction of phonology and morphology. According to the traditional model both components are separate and distinct parts of the grammar, with the output of morphological rules serving as the input to phonological processes. On the other hand, the proponents of Lexical Phonology claim that the lexicon comprises rules of both types, which amounts to integrating morphology with a part of phonology.

The present paper argues for yet another type of relationship between the two components; while they are regarded as separate, in many instances it is necessary to go back from the output of phonology to word formation rules (WFRs). This means that there are WFRs which require access not to the phonological or intermediate representations of words, but to their phonetic structure. Evidence for this proposal is provided by the analysis of three very productive morphological processes in Polish: Imperative Formation, Comparative Degree Formation and Augmentative Back-Formation, as well as some WFRs in English. It is demonstrated that neither the traditional separational approach, nor the lexical integrational frameworks can handle the relevant data in a satisfactory fashion, which necessitates the introduction of the loop between phonology and morphology.
Initial mutations in Celtic and in West African

Elmar Ternes
Hamburg

The most salient grammatical feature of the modern Celtic languages is no doubt the occurrence of the so-called 'initial mutations' (also, in short, 'mutations'). By this term we understand grammatically and/or lexically conditioned alternations of word-initial consonants, as in the following example from Breton: penn 'head' - va penn 'my head' - da benn 'thy head'. It is now generally agreed that these alternations have the status of morphophonemes in the grammatical description of the languages in question.

Celtic scholars were so fond of this phenomenon that some of them jumped explicitly to the conclusion that Celtic mutations are unique in the languages of the world. This is far from being the case, however. Mutations are to be found all over the world, inside and outside Europe. Especially one language group in Africa seems to make use of mutations to an even greater extent than the Celtic languages themselves, namely (in Greenberg's terminology) the West Atlantic languages, a subgroup of the Niger-Congo family. The best-known of these languages is probably Fula, spoken over a wide area from Senegal to Cameroon.

The main purpose of this paper is typological and will be twofold in this respect: (1) to give a synchronic comparison of the use of initial mutations in Celtic and in West Atlantic, including the phonological processes involved and the morphological and/or syntactic conditions under which they occur. (2) To give a diachronic evaluation of the historical origin of initial mutations by means of comparative reconstruction. It will be seen that - although their synchronic status is rather similar - their origin is quite different in the two language families.

A combinatory phonology of the Hebrew triconsonantal (CCC) root system

Yishai Tobin
Dept of Foreign Literatures and Linguistics, Ben-Gurion University of the Negev, Be'er Sheva, Israel

Based on the theoretical and methodological tenets of "Phonology as Human Behavior" introduced in Divi (1979), the non-random phonotactic distribution of the phonemes comprising the triconsonantal (CCC) root system in Hebrew will be analyzed according to the following criteria:

(1) the "active" articulator as opposed to the "place of articulation";
(2) the relative degree of structure (aperture) and airflow as opposed to "manner of articulation";
(3) the disfavoring of additional articulators;
(4) the disfavoring of coarticulation by near articulators;
(5) the favoring of visible articulations;
(6) the favoring of explosive articulations in initial position;
(7) the disfavoring of one distinct constriction to another within a single phoneme.

Specific comparisons within the CCC root system will include:

(8) the preference of voiceless versus voiced versus nasal members of an opposition in initial position;
(9) the preference of labials versus their non-labial counterparts in initial position;
(10) the preference of phonemes with complete constriction versus their turbulent counterparts in initial position.
Experimental studies of syllabification

Rebecca Treiman
Psychology Dept., Wayne State U

Two experiments examined college students' intuitions about the syllabification of certain intervocalic consonant clusters. We used bisyllabic words which varied in type of cluster (/s/+stop vs. stop+liquid), stress pattern (first vs. second syllable stressed), and type of vowel in the stressed first syllable ("short" vs. "long"). Examples are:

I. VCV, s: austere, mystique
II. VCVC, s: aster, mastarpy
III. VVCVC, s: Easter, cloister
IV. VCVV, non s: Madrid, agree
V. VCVV, non s: metric, Chaplin
VI. VCVV, non s: secret, okra

In the written task, people were asked how they would divide the word at the end of a line of print. They were given three choices, such as aust-ere, ase-tere, and ase-tere. The results showed effects of stress pattern and vowel type. People were most likely to place the first consonant of the cluster in the preceding vowel's syllable when that vowel was short and stressed. In addition, there was a difference between /s/ clusters and other clusters. People preferred to place the s of words like austere in the first syllable but preferred to place the d of words like Madrid in the second syllable.

In the oral task, modeled after Fallows (1981), people were asked to say the first syllable of each word twice and the second syllable of each word twice. This task permits "ambisyllabic" responses. For example, if a subject says /s/-stirl when asked to repeat the first syllable of /s/-stirl and /s/-stir-stirl when asked to repeat the second syllable, /s/ has been placed in both syllables. As in the written task, there were effects of stress pattern and vowel type. Consonants were more likely to be placed in the first syllable after a short stressed vowel than after a long stressed vowel or an unstressed vowel. Ambisyllabic responses were more common after a short stressed vowel than after a long stressed vowel. We also found differences between clusters with initial /s/ and those with initial stops. First syllable responses were more common for /s/ than for stops. Also, the /s/ of a word like austere was more often placed in both syllables than was the /d/ of a word like Madrid.

According to most theories of syllabification, the onsets of stressed syllables are maximized. Supporting this view, subjects in both the written and oral tasks more often placed the d of Madrid in the second syllable than the first syllable. With words like austere, however, the s was not significantly more likely to be placed in the second syllable than the first syllable. These results can be interpreted by suggesting that there is a tendency to begin a syllable with the least sonorant consonant. If so, the first consonant of a /s/+stop cluster is more closely tied to the preceding vowel than is the first consonant of a stop+liquid cluster.
Relations between phonological and morphological patterns

Irene Vogel
U. Delaware

English compounds in Italian: The question of the head

At least since the second half of the past century, Italian has been borrowing English compounds, but not in their full form. Instead, only one of the words composing the English compound is used in Italian (e.g. smoking and night from smoking jacket and night club, respectively) (cf. Zolli, 1976). The rule responsible for reducing the borrowed compounds is apparently still productive, accounting for novel forms created by a child who was observed to use popcorn and beauty, on the basis of the words mordoc popcorn and beauty case he heard from adults.

In this paper, the structure of the relevant types of compounds in English and Italian will be examined, specifically, endocentric noun compounds consisting of:

a) $N + N$, b) $A + N$ and c) $N + A$. An interesting difference between English and Italian with regard to such compounds is that while in English the head is always the word on the right, in Italian the head may be either the word on the right or the one on the left (cf. Scalise, 1984), as in (i), where the head is underlined.

(i) (a) $N + N$: cablo television; crocuvia 'intersection', cantastazione 'station master'
(b) $A + N$: blue Jay; altopiano 'plateau', giallo lemeone 'lemonyellm'
(c) $N + A$: colorblind; ? , cessaforse 'strong box'

When the compounds in question are borrowed into Italian, it is always the rightmost element that is deleted from the English model. That is, it is the head of the English compound that is dropped, leaving only the element that in some way modifies the head. Given that Italian itself allows compounds in which the head is on the right, as well as those in which it is on the left, the question that must be addressed is why it is always the leftmost element that is retained, despite the fact that this is not the head in the original form. Three hypotheses will be considered, and it will be shown that two must be rejected. Specifically, the observed pattern cannot be due to the stress pattern of the English forms, since stress may fall on either the first or second word (cf. water (< water closet), scotch (< scotch tape)). It also cannot be due to some overall rule of Italian that shortens words by dropping the ends since, for example, nicknames may come from different parts of a name (e.g. Gio (< Giovanna), Gigli (< Luigi)). Instead, it will be argued that the choice of the leftmost element is due to the basic syntactic structure of Italian as an SVO language, where typically, the "modified" element precedes the "modifier", or in other words, the head precedes the complement. That is, despite the presence of compounds in Italian with the head on the right, it will be proosed that it is the basic word order patterns of the language that are responsible for the English compounds being analyzed, independently of the meanings of their individual components, as structural units in which the head is taken to be what is in the unmarked position, the left side.
Dynamique et diversité des usages en phonologie

Henriette Walter
Paris

Parce qu'une langue qui fonctionne met en contact des individus aux systèmes phonologiques en partie divergents, une description phonologique ne doit pas manquer de prendre en compte la diversité des usages. Cette diversité se manifeste à différents niveaux : le nombre des unités phoniques que distingue chaque locuteur, la manière dont il les réalise phonétiquement suivant les contextes et parfois les situations, le degré de cohérence de chaque individu par rapport à son propre système phonologique, ou au contraire les hésitations de certains vis-à-vis des phonèmes composant le signifiant d'une unité lexicale donnée.

De plus, comme ces divergences peuvent être liées à l'âge, à la situation géographique, à l'appartenance sociale et à bien d'autres facteurs, la description de la langue dans son ensemble se heurte à de multiples difficultés. Ces dernières ne sont pas complètement insurmontables si l'on s'attache, à la suite d'André Martinet, à toujours adopter un point de vue dynamique en cherchant à identifier les mouvements qui agitent le système commun, et en étudiant les changements au moment même où ils se produisent. Sur le plan pratique, on peut tourner ces difficultés en excluant dans un premier temps les problèmes liés à la diversité des usages et en étudiant chaque idiolecte séparément. Une fois les lignes de force et de faiblesses identifiées chez l'individu, on aura acquis une connaissance suffisamment précise des problèmes pour pouvoir ensuite mettre en lumière les tendances dynamiques du système commun.

Tout cela implique, pour le descripteur dont le souci est de comprendre comment fonctionne la langue au moment où il l'observe, de veiller à éviter trois écueils également séduisants :
- le désir de théoriser et de formaliser à outrance aux dépens des réalités à décrire ;
- la tentation sociologisante, qui conduit à privilégier l'étude des facteurs sociaux, au risque d'oublier que c'est la langue qui est l'objet d'étude ;
- les dangereuses confusions chronologiques, tant il est vrai que la dynamique se manifeste en synchronie (pour les changements en cours) autant qu'en diachronie (pour les changements révolus).

Quelques exemples précis illumineront de façon plus concrète les méthodes pouvant être employées pour la description de la phonologie d'une langue dans toute sa complexité, sa variété et sa dynamique.

---

The importance of combining forms

Beatrice Warren
Dept. of English, U Stockholm

There are certain morphemes which linguists feel are neither proper roots, nor proper affixes, eg psycho-, bio-, -crat, -nik, -thon. Most word-formationists use the term combining form for such elements. A comparison of the descriptions and definitions of combining forms in different works on word formation reveals that there is as yet no standard account of these elements. The paper to be presented is an attempt to improve on the descriptive as well as the explanatory adequacy of the accounts of combining forms.

For heuristic purposes, a corpus of examples of combining forms (approximately 60) has been collected, all of them deriving from Mort: NEW WORDS, a collection of new words appearing during 1986 in British newspapers and journals. The examples will naturally be discussed in some detail.

It will be argued that the most interesting aspect of combining forms is the ad hoc manner in which they can be formed. As an example, consider bootlegger, which originally referred to people who carried liquor (in flat bottles) in bootlegs, but which was later specialized to mean "person selling illicit liquor". By exploiting the fact that most English speakers will associate this particular meaning with bootlegger, it is possible to express meanings such as "person selling illicit books" or "person selling illicit Beatles records" with booklegger and Beatlelegger, respectively - thus forming on the spur of the moment the novel morpheme -legger meaning approximately "person selling (sth) illicitly".

---
Syntax or morphology? The acquisition of clitic pronouns in French

Jürgen Weissenborn
Max-Planck-Institut für Psycholinguistik, Nijmegen

In a number of studies on the acquisition of French it has been assumed that clitic pronouns constitute a relatively late development (Clark 1985). This assumption crucially relies on the hypothesis that the child starts out categorizing clitic pronouns as noun phrases, as in Kayne (1975). The late acquisition is then explained by the child's necessity to get access to the information how these noun phrases can occur in 'non-canonical' positions, e.g. through movement and chain formation.

In fact, clitic pronouns occur in their correct position quite early in French-learning children. This finding can be explained if we assume that the child does not treat clitic pronouns like other noun phrases but categorizes them as affix-like elements that participate in lexical processes not involving movement, as proposed by Borer 1984.

These two categorizations, the clitic as a noun phrase and the clitic as an affix, make different predictions with respect to how we should expect the acquisition of clitics to proceed. The acquisition data suggest that the lexical analysis of clitic development is correct.
Perceptual learning of systematic vs. unsystematic foreign accents

At the Fifth International Phonology Meeting in Eisenstadt 1984, an investigation of listeners' comprehension of foreign accents was presented. (See Wingstedt & Schulman 1987.) The main purpose of the investigation was to study whether perceptual learning, i.e., improvement of comprehension of phonologically-phonetically distorted speech (such as a foreign accent), is possible, and how the listener may accomplish this.

A series of experiments had been conducted in which native Swedish speakers were exposed to utterances spoken with a fictitious, heavy foreign accent, where different pronunciation errors occurred systematically, and therefore predictably. The results indicated that listeners' comprehension of such an accent does improve even after a relatively small amount of exposure to it, and that such an improvement is a result of employing analytic strategies rather than merely memorising individual word gestalts.

In evaluating the outcome of the investigation, it is important to consider the extent to which these findings are generalizable. As stated above, the fictitious accent used in the experiments was entirely systematic. However, as many empirical studies on L2 phonology indicate, complete systematic/predictability is not a typical characteristic of authentic accents. This raises interesting questions: If it is the case that perceptual learning is primarily accomplished by employing analytic strategies, is systematicity in phonological deviations a prerequisite for such learning to occur? Is a listener unable to improve his comprehension of an accent which is highly variable, or may other perceptual-cognitive strategies come into play?

To investigate these issues, a follow-up study is now being conducted. In a controlled experiment, comparable to the earlier ones, listeners are exposed to utterances spoken with a fictitious accent, for which the same system of pronunciation rules has been used, but these rules are implemented unsystematically (non-obligatorily). The performance of the subjects is then compared with the performance of earlier test groups. We will consequently be able to state whether listeners' ability to improve their comprehension of a foreign accent is correlated with the systematicity of that accent.

The methods and results of this study will be presented and discussed.

Let us assume that inflectional morphology is a (sub)component of the lexicon. In
the dictionary, the lexicon words are listed in their basic forms. Words with un-
marked inflectional class membership (e.g. the German feminines with ~ plural) have no explicit entries of inflection; words with marked class membership (e.g. German feminines with ~ plural) have explicit entries of inflection in terms of rule features. These specify those inflectional rules from which all other inflectional rules applying to the word can be inferred by implication. All inflectional rules not stated in the lexicon entry of words are introduced by paradigm structure conditions which operate on the basis of syntactic-semantic and phonological properties and/or lexical inflectional features. The paradigm structure conditions reflect the structure of inflectional paradigms and thus of the entire inflectional system of a language. Inflection is ensured by inflectional rules which formally symbolize the categorial features specified in syntactic chains in the word, which is then inserted into the sentence in its inflected form.

The presented inflectional mechanism allows not only a differentiation of regularly unmarked and regularly marked inflection but also an adequate description and integ-
oration of irregular cases, i.e. exceptions. These differ from regularly marked
cases in that their lexical inflectional specifications relate to categories not
elsewhere occurring in inflectional specifications (cf. the rule features
[sg/Gen.Sing] and [n/Dat.Sing] in the German noun Herz while otherwise only plural rules are specified in the lexicon and case rules 'automatically' follow from them) and/or that their lexical inflectional specification contains several stems, that is, has a 'suppletive' nature (cf. English foot/feet and German stehen/stand). In

this way exceptions are no longer determined in quantitative terms (by small number) but in qualitative terms and can be clearly differentiated from regularly marked single cases (e.g. the only two German neuters Kloster and Kloster that have plural umlaut).
There are three aspects to the description of inflectonal morphology (IM):

- **distribution**: Where can formative bearing certain features of morphological relevance occur in syntactic constructions?
- **form**: How are features of morphological relevance realized as distinct word forms (inflected forms of lexemes)?
- **shape**: What phonological shapes can these word forms take?

These being naturally allotted to syntax, lexicon, and phonology respectively. Generative morphologists have diverged in their treatments of the formal aspect, however, some assigning it all to syntax, some dividing it between syntax and phonology, some assigning it all to phonology, some giving it a place in a separate component of lexical rules. (The fact that a particular approach has been characterized as 'lexical' or 'lexicalist' says little about which of these theoretical decisions it makes.) Treatments of derivational morphology (DM) differ in a parallel, but independent, way. And when IM and DM are located in the same component, they are treated as separate subcomponents by some theorists but not by others.

In the theory assumed here (see my papers in *Berkeley Linguistics Society* 12 (1986) and *Eastern States Conference on Linguistics* 3 (1987) and 4 (1988)) the formal aspects of IM and DM belong to distinct subcomponents within a 'lexical' component (itself distinct from syntax and phonology); IM rules predict the default forms realizing combinations of morphosyntactic features; such rules do not directly describe a 'syntax' of morphemes within forms, but rather invoke formal operations on bases or stems; and parochial stipulation of rule ordering is avoided, sequential application and preclusion following instead from universal principles and from other parochial stipulations.

My focus here is on how IM, as so conceived, fits with other parts of a full grammar: with the lexicon proper, which will be viewed as a (highly redundant) list of all grammatically relevant information about lexemes, including their inflectional forms; with DM rules, which express default predictions about the existence of lexemes and so ordinarily serve as input to IM rules; with rules of 'postlexical' or 'phrasal' phonology, among which are some that resemble IM rules and have the effect of overriding them, and especially with syntax, with respect to two classes of phenomena: parallels between IM and such 'function words' as adpositions, and the analysis of 'clitics', both of the 'phrasal affix' (PA) and of the 'bound word' (BW) variety.

It is often assumed that syntactic rules distribute both types of clitics. But there is evidence that the standard examples of PAs (possessive markers in English and Finnish) are to be treated syntactically just like IM (i.e., via principles distributing features rather than formatives), and morphologically like an outside layer of inflections. For BWs (Eng. clitic auxiliaries, Finnish particle clitics), on the other hand, there is some question as to whether any sort of morphology at all is involved; it has been suggested that their attachment to neighboring word forms is purely phonological. But lexical idiosyncrasies of BWs and their involvement in 'surface filters' and in special postlexical morphophonemics argue that they form 'morphosyntactic words' (MWS) with their neighbors - word-like structures composed of a host word form and one or more clitic word forms. It appears that the way to describe MWS is via surface filters, stipulating a set of slots, an ordering for them, and a set of fillers for each. Such a scheme, of templates for flat structures, is the one I have proposed for the internal organization of word forms themselves, suggesting a formal parallel between BW clitics and inflectonal affixes.