Abstracts

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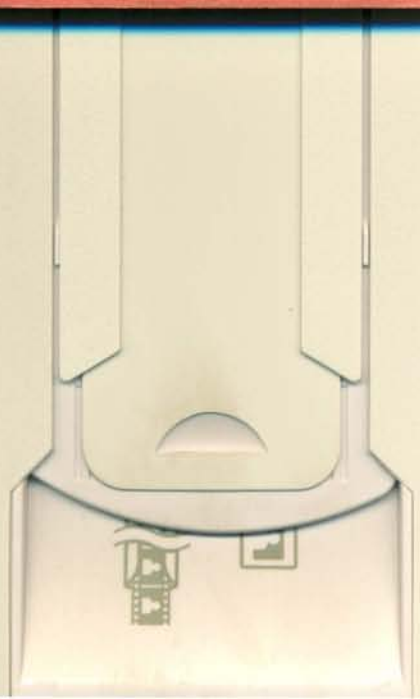

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Towards a classification of clitics and their relation to morphology and syntax

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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 pronounciatory 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 #(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 pronounciatory charachteristics of the text and so is linked with linear representation of text-constituting morphemes. One can name the following strategies as to the relation between clitics and syntax: 1). In the sentence there is one place specifically assighed for clitics only. Most often, it is the position in compliance with the 'law of Wackernagel' 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: Louvite, Lydian, Lycian), Berber, some Cushitic (Somali) and some languages of South-East Asia (South-Sulavesi). Each clitic has its specific place, or rang, 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', -pát 'even, but (a thema-rhematic organization marker)', Berber Beni Snus qā(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-Asiatic and Uralic languages.In synchrony, most wide-spread 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

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

(2) Διαθέσεις δέ εἰσι τρεῖς, ἐνέργεια, πάθος, μεσότης· ἐνέργεια μὲν οἷον τύπτω, πάθος δέ οἷον τύπτομαι, μεσότης δέ ἡ ποτὲ μὲν ἐνέργειαν ποτὲ δὲ πάθος παριστᾶσα, οἷον πέπηγα διέφθορα ἐποιησάμην ἐγρηγάμην.

The first diathesis ἐνέργεια means "activity, performance" and is exemplified by Thrax with τύπτω "I beat". πάθος means "that which happens [to a person or thing]; suffering, affection" (N.B. Latin *passivum* "suffering") and is exemplified with τύπτομαι which can mean "I am beaten". It should be obvious, however, (i) that the specific form of the verb τύπτομαι is the "middle" (using modern terminology) and not the "passive" (the aorist "passive" is ἐτύφθην) and (ii) that it can also mean "to beat, strike oneself", especially "to beat one's breast [for grief]". The third diathesis μεσότης does not represent a separate and distinct diathesis as such, but on the contrary includes the various forms that do not belong to the "active" or "passive", i.e. according to the examples given by Thrax the perfects with "active" endings but "intransitive/passive" meaning as well as sigmatic aorists conjugated in the "middle" but with "active" meanings. Thus we see that according to the Greek grammatical tradition (and supported by the actual structure of the Classical Greek language itself) there are only two single inflectional diatheses: the active (ἐνέργεια) and the middle (πάθος); there is no evidence for the existence of an inflectional category "passive".

The inflectional middle (πάθος) appears after markers for mood and especially tense and hence (i) it belongs to the periphery of the clause 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 πάθος) 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 fact that 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.

Sapir's approach to typology and current issues in morphology

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In his book *Language*, Sapir outlines an approach to the typological classification of languages which was intended to replace previous, overly simplistic typologies. This view is based on three potentially independent dimensions: the type of concepts given formal expression in a language; the formal means by which these concepts are expressed; and the degree of internal complexity of particular words. While most subsequent writers have given lip service to the superiority of Sapir's scheme over, e.g., the traditional description of languages as isolating, agglutinating, or inflecting, there has been little attempt to pursue the content of his categorization in detail.

In this paper, I will examine the relation of Sapir's classificatory dimensions to some current issues in morphological theory. In particular, it will be argued that Sapir's classification of types of concepts is founded on a view of the separation of syntactic from lexical principles that is quite similar to what is now known as the "Lexicalist Hypothesis"; and that this provides an appropriate basis for the traditional distinction between inflection and derivation. As a result, his typology can be seen as characterizing the balance within particular languages between derivation and inflection, and between lexicon and syntax.

As with other classificatory schemes, the question arises of whether Sapir provides a typology for languages as a whole, or only for individual processes (which may vary in type within a given language). I will argue that the dimensions of this classification correspond to plausible parameters in the formulation of morphological rules, and that the ideal types of previous approaches correspond to the degree to which a language obeys certain general constraints on its Word Formation Rules.

The discussion will be based on consideration of selected examples from (non-Indo-European) languages generally taken to represent divergent morphological types.

FOOTNOTE

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Problems in the lexical phonology of Icelandic

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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 atricle 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 lexicalization 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 the loss of the phonetic motivation, by becoming morphologised, i.e. by acquiring some morphological function as an exponent of a morpological category.

Lexicalization forms a list of predefined signs, and phonological information is stored in the lexicon, as part of the characteristics 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 entries 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.

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Rules vs. regularities in Italian intonation

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Abstract. Which is the division of labour between phonology and phonetics in the description of Italian intonational system? This study addresses the question in light of the ongoing debate on the nature of the intonational phenomenon known as "declination". The widespread tendency of speech fundamental frequency (F0) to gradually decline over the course of utterances has been mainly described as: 1) a global phonetic property of utterances: physically emerging from physiological organizational constraints of the production system (e.g. Gelfer et al., 1983, 1987); or reflecting sentence preplanning (e.g. Cooper and Sorensen, 1981). 2) As the by-product of local phonological rules, generating an accent-by-accent F0 modulation.

The hypotnesis of declination as a global phonetic component in Italian was tested in a previous study by the first author: there, acoustical and statistical analyses of F0 contours were made in simple and complex declarative sentences varying in length. Complex sentences consisted of two clauses, including /e/ and /ma/ as coordinating conjunctions, with the following patterns of length variation: short-short, short-long, long-short and long-long. The aim of the experiment was to verify presence and degree of "declination" and "resetting".

While we did find weak evidence of declination for all the speakers, we did not get statistical support to the claim of Cooper and Sorensen that declination properties such as F0 resetting and initial F0 peak reflect high level (syntactic) control on declination.

In the present study we suggest that:

1) our results on sentence declination are consistent with a phonetic explanation of declination control, involving articulatory rather than syntactic factors, such as the respiratory-laryngeal synergism activated during the act of speaking (e.g., Collier, 1975).

2) Our data on resetting are incompatible with the phonological hypothesis of a global hierarchical organization of the intonational structure (Ladd, 1986): according to which resetting signals cross-boundary dependency relationships between adjacent prosodic domanins.

3) Some local regular patterns of F0 declination we observed in Italian are instead compatible with a phonological interpretation in terms of pitch accents and rules of "tune" construction (e;g. Liberman, 1978; Liberman and Pierrehumbert, 1984).

4) Some utterance-level effects of final lowering may be viewed as a case of ongoing phonologization processes, rooted on (and constrained by) the requirements of the motor system.

Tonal elements and tonal features in sentence level intonation

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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 to be found in its hierarchical structure because 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 deliminated 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 signalling 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

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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 will 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, [doč] 'daughter' but [doǰbʲ] 'daughter would' for example), as well as in point of articulation (to other stridents in Arabic (e.g. /ma+fii+š sitta/→[mafiissitta] 'there aren't six') and Hungarian /makač tsitsa/→[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 Hankamer and Aissen (1974), Wheatley (1981), and Steriade (1982), among others and to the discussions of hierarchical feature representations in Clements (1985) and Sagey (1986).

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The Danish stod as a case of phonology-morphology interface

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The Danish stød 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 Basbøll in FL XIX 1985 with references). The specific phonological representation of stød in terms of a laryngeal tier or the like will not be discussed here. In Basbøll forthc. (Bertinetto and Loporcaro: Certamen Phonologicum I, Pisa: SNS), I have attempted to account for a large part of the stød-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. bimoric) 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 stød rule" mentions neither -(phonetic or phonological) stød-basis", nor conditions on stress, which is unavoidable in all other stød-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" [ˈsoːfa, ˈsoːˌfæːˈn̩], stød, vowel lengthening, vowel quality change and secondary stress all follow automatically from the concatenation of the phonological representations in question (the definite morpheme being bimoric). This apparently very complicated type of alternation, which is, however, extremely productive and is never simplified by native speakers, has not been uniformly described before.

Whereas an important part of the stød-problems have come closer to a solution by this account - basically a phonologically one -, most of the remaining stød-problems can only be understood as a case of interaction between phonology and morphology. If you compare the verb 'udtale' "pronounce" [ˈuðˌtæːˈlə] with the noun 'udtale' "pronunciation" [ˈuðˌtæːlə], it is clear that part-of-speech information is crucial (verbs, including deverbative derivatives, and complex adjectives being more liable to undergo stød-addition than nouns). Also morphological composition is essential, cf. a sequence of identical morphemes in the same order but with different stød-conditions: 'efterligning' "imitation" (derived from the verb 'efterligne' "imitate") [ˈɛfdɐˌliːˈneŋ] vs. 'efterligning' "assessment of taxes after the main assessment" (composed of 'efter' "after" and 'ligning' "assessment of taxes") [ˈɛfdɐˌliːneŋ]. 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 stød presupposes at least secondary stress).

Discourse related word formation processes in Brazilian Portuguese

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The main goal of this paper is to establish the relevance of discourse functions of word formation in Brazilian Portuguese.

I assume that the lexicon in natural languages is a self-expanding data system that has the interconnected functions of categorizing realities and furnishing primary units for the construction of linguistic utterances.

Lexical expansion is necessary because communication and cognition constantly require new representational and constructional units, and these must be both potentially permanent and instantly spreadable. That is, these new units must be ideally produced by lexical patterns.

Word formation is perhaps the most relevant instrument for lexical expansion. Processes of word formation provide new representational units (semantic function) and new utterance construction units (syntactic and/or discourse function).

This paper concentrates in discourse related word formation processes in Brazilian Portuguese. Two main types of discourse related functions are studied: the subjective expression function and the discourse strategy function. The first is centered in the speaker and is characteristic of colloquial speech; the second is audience centered and is fundamental in formal written texts.

Some of the processes to be briefly described under the first type are the various subjective expressions of gradation and the oppositions between neutral and pejorative suffixes for nouns and adjective formations.

As for the discourse strategy function, nominalization will be analyzed in its triple role of semantic transference of verbal contents, text condensation and actualization of a number of discourse strategies, such as modalization and characterization of discourse types.

It will be argued that discourse functions are related to productivity in Portuguese word formation.

Is morphological structure relevant to phonological rules? Evidence from Semitic

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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.I), 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 Human Languages v.II) and others, and discussed in Dressler (1985; Morphonology). The interest of this paper is that the claim is made with respect to Semitic, whose rich morphological structure has been argued to be refered to by phonological rules.

I will discuss Modern Hebrew Metathesis, a rule which has been claimed to be morphologically conditioned (Bolozky 1980; LI 11:14). Metathesis applies to a /t/-plus-sibilant sequence across the boundary of the fifth binyan; e.g. /hit+caref/ --> [hictaref] 'he joined' (but /hi-tsis/ --> [hitsis] *[histis] 'he fermented' and /t+šuva/ --> [tšuva] *[štuva] '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 (1988; to appear in LI 19:3), the ordering of Metathesis with Voicing Assimilatation 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 of whether bundaries 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

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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 (I.P.A), 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 deplacement. 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.

The empty morpheme hypothesis

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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.

Scr	*parkiraj-* 'park'	: *parkiral-išt-e (N)*	'parking lot'
	kopiraj- 'copy'	: *kopirao-nic-a (F)*	'copying shop/room'
	svinja 'hog"	: *svinj-ac (M)*	'pig sty'

The grammatical gender is more predictable in these derivationa than affixation: Locative$_1$ derivations, meaning "place in which", are consistently Fem, Locative$_2$, 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.

La flexion interne ou bien une espèce particulière d'affixe?

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Comme ça le système morphologique sémitique pose la question devant la linguistique et la typologie.La langue arabe est ici l'example préféré.

Le point de vue traditionelle (l'inflexion interne) prend en considération non seulement l'alternances vocaliques de base, mais aussi la gémination de consonnes de racine.Cependant cette approche ne donne pas des définitions exactes pour la typologie.

Le point de vue non-traditionelle contient une idée d'une morphème interrompue (discontinuous morpheme) - diffixe, transfixe,confixe, et par conséquent -morphème consonantique interrompue de racine.

La deuxième approche se présente plus tentante comme une interprétation plus claire et plus conséquente typologiquement. Cependant elle ne peut pas nous éxpliquer certains phénomènes: absence d'opposition entre des bases primitives, gémination de cosonnes de racine et longueur vocalique.Cette approche exige d'introduire des opérations et des notions supplémentaires - telles comme une opération de séparation du niveau suprasegmental ou bien - d'admission de l'inflexion interne des consonnes de racine.

Happiness and misery of experimental phonology

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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 kieli* 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

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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.

On phonologically conditioned suppletion

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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. Lass'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 restriced 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 infectional 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.

Acquisition principles in word-formation: Some comparisons of English and Hebrew

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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)

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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.

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

The aim of our comunication in The Sixth International Phonology Meeting is to focus the case of consonantal harmony in Bakairi under the Autosegmental theory. We want to know if the strategies offered by Autosegmental 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 stpos 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**
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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 tautosyllabic 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 A$B is more highly valued to the extent that segment A has greater sonority than segment B. 5. Markedness criteria reveal a strong crosslinguistic 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 demisyllables, but minimally and asymmetrically distributed in final demisyllables. Sonority is characterized in terms of the three stricture features *sonorant, approximant, vocoid*. This principle allows us to state a complexity metric that evaluates the relative complexity of demisyllables, 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 parameterization. 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 demisyllables. 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 demisyllables (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 nonoverlappping bipartite organization; that is, the second 'weight unit/mora' of mora theory and the 'onset' of onset/rhyme theory seem not to be required as constituents, at least from the point of view of syllabification.

Clements, G.N. (in press) "The Role of the Sonority Cycle in Core Syllabification," to appear in J. Kingston and M. Beckman, eds., *Papers in Laboratory Phonology I*, Cambridge University Press.

Tonal realisation in Yoruba: Implications for universal pitch phonology

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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 downtrends, and to define idealised 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 & 5) mixed tone statements beginning HH and LH; (6 - 9) questions formed from groups (4) and (5), with initial question particles ṣé and ǹjé. 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 that 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 ṣé-questions: the initial HLH 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.

Pour un composant lexical associatif et stratifié

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Je me propose dans cette communication de défendre l'idée que dans une grammaire de type génératif doit figurer un composant **associatif et stratifié** chargé de rendre compte de la formation des mots complexes. Le prédicat "associatif" signifie que ce composant doit engendrer **conjointement** et en les associant intimement la structure morphologique et l'interprétation sémantique des mots construits; "stratifié" signifie que l'organisation et la succession des opérations qui le composent doivent rendre compte de la hiérarchie **réelle** (et non pas nécessairement observable) des régularités, sous-régularités et irrégularités de tous ordres et de toutes origines qui caractérisent le lexique construit d'une langue naturelle comme le français. C'est parce qu'il réunit ces deux propriétés que le modèle propose (cf. D. Corbin, 1987) s'oppose à la plupart des modèles lexicalistes concurrents, et notamment à ceux qui tentent de transposer le système "X barre" à la représentation de la structure des mots.

Un exemple illustrera le propos. Soit le nom anxiété: d'une part ses relations formelles et sémantiques avec l'adjectif anxieux, d'autre part la régularité de ces relations par rapport à celles qu'entretiennent par exemple généreux et générosité interdisent de lui donner le statut de mot non complexe (comme chat) ou même celui de mot complexe non construit (comme royaume ou gringalet). S'il s'agit d'un mot construit, un certain nombre d'arguments indiquent que sa base est anxieux, et qu'elle ne peut être ni *anx(e) (segment non autonome sans catégorie ni interprétation sémantique), ni °anxie (base de anxieux, non attestée à l'état autonome, mais catégorisable et interprétable). Dans ces conditions, il convient d'expliquer

(i) de quelle manière est construit anxiété, c'est-à-dire notamment quels sont la forme, le contenu et le statut grammatical de la règle de troncation que suppose sa construction sur anxieux;
(ii) la forme particulière que prend le suffixe (-été) dans ce mot;
(iii) le statut particulier de anxiété, plus régulier que *anxieusité, interdit par les règles du français, mais moins régulier que °anxiosité, forme attendue mais non attestée.

La réponse à toutes ces questions, à l'intérieur du modèle stratifié proposé, constitue une validation de celui-ci.

Phonological issues in psycholinguistic research

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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 the 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.

A preliminary study on the hierarchical subset model of the feature system

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The present study aims to examine the model of the acoustic feature system of Dantsuji (1987). It is usual for each feature to have a single correlation with some physical parameter in a general linguistic theory. However, some linguists suggest new models of complex, many-to-many relationship between features and physical parameters. Our model is characterized by properties given below. i)Every feature is related to some subset of the set which consists of the limited numbers of the acoustic parameters. ii)Acoustic parameters of each subset are organized into hierarchical structure. iii)Compensatory interaction occurs among acoustic parameters of hierarchical structure due to the variety of the phonetic environment, the rate of speech, etc. This compensation, however, might be able to be predicted beforehand in a certain degree. In order to examine this model, we have tried to distinguish place of articulation of voiceless nasals in Burmese and half nasals in Sinhalese as preliminary research. The results indicate that bilabials, dentals / alveolars and velars could be effectively distinguished by means of a step-wise discriminant analysis utilizing the values of F1, F2, F3, etc. with respect to the features [compact] vs. [diffuse] and [grave] vs. [acute]. This confirms the view that if we choose appropriate sets of features and acoustic parameters, we will be able to obtain satisfactory and efficient result.

MORPHY: an Italian word analyzer

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The paper describes MORPHY, a model for organizing the lexicon of a moderately morphological language like Italian (1).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) (2). 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 analyse 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', *riderete* '(you) will laugh', etc., and the root *ris* for forms like *risi* '(I) laught', *risero* '(they) laught', *riso* '(she) has laught'. 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.

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Bruce **Derwing**

Formal relations and argument structure

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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 N(oun), then the category of the word will be a N and its external argument will be RE(FERENCE), as in (1). The external argument of a noun is realized syntactically when the N is used as a predicate. Thus it is realized in (2) but not in (3), where the internal argument, the TH(EME), is saturated by John:

(1) $[[lazi_A]\ [ness_N]_N]$: (RE,TH)
(TH) (RE)
(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 X^0 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 proposoded 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) $[flower_N]\ [arrange_V]$: (AG)
(RE_1) (AG,TH_1)
(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 X^0 are analyzed by the morphology, and that X^0 are opaque with respect to sentence level laws and principles.

(6) $[[ready_V]\ [able_A]_A]$: (TH,EX-$\emptyset$)
(EX,TH_1) (TH_1)
(7)a. $[[advise_V]\ [ee_N]_N]$: (RE,AC-$\emptyset$)
(AC,TH_1) (RE_1)
b. $[[advise_V]\ [er_N]_N]$: (RE,TH-$\emptyset$)
(AC_1,TH) (RE_1)

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

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From a semiotic point of view, morphopragmatics comprises the universal pragmatic foundations of morphology 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. leg-nagy-obb 'greatest') and excessive (e.g. legesleg-nagy-obb) and their German equivalents größte(r) and allergrößte(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 cotext and on the context of situation.

Moreover we will deal with the diminutives in Hung. -i. -(cs)ke/a (e.g. zongora 'piano' —> zong-i, zongorá-cska, zong-i-ka) and in Vienn. -i, -erl (e.g. Hund 'dog' —> Hunt-i, Hunt-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 Vienn. -erl, Hung. -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. D-4100 Duisburg: Linguistic Agency University of Duisburg, Series A, Paper 194, November 1987

The role of frequency, syllable structure and style in phono-morphological change

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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*
in order the people with to deceive

The study has been performed on the West Flemish dialect of Bruges, a dialect that seems to be a nice example of Dresslers (1972,1980) suggestion that changes as reduction and apocope fail to apply to lexemes, but freely apply to inflectional endings: the dialect of Bruges shows from the early middle ages on apocope of -e in inflectional endings, but to this day not in lexical items (sonne 'sun').

The disappearance of the gerund ending - a change which has occurred in all the Germanic languages - has mainly taken place in the period between the end of the 13th (93%) and the beginning of the 17th century (32%). In order to trace the linguistic and stylistic factors that affected the disappearance of the gerund-ending, I have collected about 700 constructions with infinitives that could have had an inflected ending, from prose texts written in four different styles (Statutes, Chronicles, Diaries and Public Trials) in the last quarters of the 13th, 14th, 15th and 16th century. My data show that the disappearance of the gerund-ending has been in a statistically significant way conditioned by the following factors:

Style: The change takes place quicker in informal than in formal styles.

Frequency of the verb: The change takes place quicker in infrequently used verbs than in frequently used ones.

Syllable structure of the verb: The change takes place quicker in polysyllabic verbs than in monosyllabic ones.

Syntactic construction: the occurrence of the ending -e depends on both the complexity of the syntactic construction and the function of the clause that contains the infinitive.

The results of my study confirm Dresslers hypothesis that obliteration of inflectional endings caused by sound change, originates in casual speech.

Freezes, prosodic theory, and the modularity of grammar

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Freezes are conjoined expressions in which the order of the conjuncts is fixed: **here and there**, but ***there and here**. As Cooper and Ross (1975) have observed, the order of conjuncts in freezes is determined by an interplay of phonological and semantic features; some of these features are listed in (1). In a quintessential freeze, several of these features join forces to determine the order of conjuncts; examples of such freezes are provided in (2).

In this paper, I shall account for the order of conjuncts in freezes within the framework of the prosodic theory developed in Stein and Gil (1980) and Gil and Shoshany (1984, to appear). Man's prosodic competence is an autonomous mental faculty, 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 Gil (1986, 1987) it is argued that it may also be invoked to account for various phenomena pertaining to ordinary, non-artistic language.

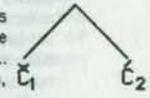
(1)

	First Conjunct	Second Conjunct	
(a)	fewer syllables	more syllables	(phonological)
(b)	higher second formant	lower second formant	(phonological)
(c)	more sonorous onset	more obstruent onset	(phonological)
(d)	close	far	(semantic)
(e)	male	female	(semantic)
(f)	singular	plural	(semantic)

(2) (a) here and there features (b),(c),(d)
(b) man and woman features (a),(b),(e)
(c) Mick Jagger and the Rolling Stones features (a),(b),(f)

Within prosodic theory, hierarchic 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 OF 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 conjuncts 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 conjuncts 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 Pāṇini'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 conjuncts to be determined by a combination of phonological and semantic factors, functioning in concert. However, as suggested above, the rules determining the order of conjuncts 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.

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Intonational phrasing and the prosodic hierarchy

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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 saliency 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.

Do the classical morphological types have clearcut limits?

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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 (an)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 cohesiveness of human languages.

The effect of nasality on vowel height: The phonetic & phonological relationship in Romance

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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 research differs widely in nature & in the range of languages used, cf. Beddor(1983). Observations regarding nasality & its relationship with vowel height have been justified for diachronic, synchronic, phonetic, morphophomenic, & 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 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

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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 tow 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 tow-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

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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: (i) 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. (1d) and (2c). (ii) Genuine initial strengthening appears to be limited to languages with independent evidence for medial obstruent weakening; cf. (1c) and (2b). (iii) Apparent 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' : 'strong' pattern goes back to earlier geminates with degemination. For (6), the evidence of other Italic dialects suggests a scenario of medial weakening of intermediate **f, θ, x(ʷ)*, rather than an initial strengthening of intermediate **β, δ, ɣ(ʷ)*.)

(1) (a) Lat.	rēgem	Span.	[r̃ey]	'king'
	leōnem	Catal., Leon.	[λeon]	'lion'
	nārēs	Leon. dial.	[n̄aris]	'nose'
(b) Lat.	terram	Span.	[tieɾa]	'earth'
	illa		[eλa]	'she'
	annum		[eɲo]	'year'
(c) Lat.	vidēre	Span.	veθer > ver	'to see'
	habēre		[aβer]	'to have'
	pacatum		[paɣaðo]	'pleased'
	cippus		cepo	'pole, branch'
(d) Lat.	amarum	Span.	amaro	'bitter'
(2) (a) Skt.	ya-	dial.MIAr.	ǰa-	'who (rel.pron.)'
	vasanta-		basanta-	'spring (season)'
(b) Skt.	mata-	dial.MIAr.	mada, maθa	'thought'
	kṛtaka-		kidaya, ki(y)aθa	'done'
(c) Skt.	karōti	dial.MIAr.	kara(d)i	'does'

(3)	Medial		Initial
	Weaker obstruent	:	Stronger obstruent
	Weaker sonorant	:	X = Stronger sonorant

(4) PIE	*wiros	Olr	[fer] (via *[βer-])	[gwir]	'man'
	*rowdhos		[r̃uað]	[ɾið]	'red'

(5) Lac-Simon Ojibwa:	Medial	Initial
	d	t
(vs.	t	t)

(6)	PIE		Latin	
	*bh	:	f-	-b-
	*dh	:	f-	-d/b-
	*gʷh	:	f-	-w/gw-

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

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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 thir- 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 (F_0), 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 F_0 on e.g. -teen in thirteen men (due to the way the focus projection rules of English apply). This stress would be realized as F_0, for example, when the word is cited in isolation or focussed in a sentence, but not when thirteen 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 F_0 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 F_0.

The parameter of F_0 is 'stronger' than that of duration in giving the impression of stress or prominence. Syllabic (temporal) rhythmic patterning is always present, however, but is perceived most clearly in the absence of accompanying F_0 movements. This tonal patterning masks the rhythmical alternations associated with syllable duration. In short, it is syllabic rhythm (temporal patterning) that accounts for the prominence ('stress') on thir- in thirteen men and accentual/tonal patterning which accounts for the prominence on -teen in thirteen cited, for example, in isolation (i.e. -teen has an F_0 top which thir- does not).

Acoustic data relating to this latter analysis of the rhythm rule phenomena in English will be presented and their significance for the development of a text-to-speech rule system will be discussed.

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Perceptual constraints and tonal features

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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 /ɑ/ 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 to test cross-linguistic aspects of tonal movement perception.

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The phonetic and phonological basis of the simplex feature hypothesis

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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 porposals (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 SPE [+back], [+round] [+low], [+high]	Sanders, 1972; Lass, 1984 [back], [round] [low], [high]
tridirectional	Goldsmith, 1985 Rennison, 1986 [+I], [+U], [+A]	Anderson & Ewen, 1987 Kaye et al., 1985 Schane 1984 [I], [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 concensus 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).

Prosodic structure and lexical representation: The role of features

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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 of course 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.

Lexical morphology/phonology or stratificational grammar? Against the proliferation of redundancy-free word-formational levels in the lexicon

As Lexical Morphology and Phonology (LMP) has evolved, persuasive evidence has accumulated that, in Universal Grammar (UG), the lexicon is divided into various levels (strata), at least some of which contain purely phonological rules. While accepting these basic tenets of LMP, this paper presents arguments against three further, interrelated characteristics currently assumed (if only tacitly) for that theory: that the lexicon is minimally redundant, that its "earliest" strata contain non-productive morphological rules (like **-th** suffixation in English), and that the input to the earliest stratum is a list containing all and only the root morphemes of a language, both free and bound. The present evidence shows that positing these characteristics enmeshes LMP in hitherto undiscussed problems, while abandoning them solves certain previously-noticed difficulties and raises no new problems, since the properties in question are not necessary aspects of a lexical perspective on morphology and phonology. On the approach argued for here, the lexicon contains more redundancy, but the expression of the latter is independently motivated, and the result is a less "stratificational" lexicon.

In particular, it can be demonstrated that polymorphemic stems associated overall (not morpheme-specifically) with grammatical idiosyncrasies must be included, along with free roots, in the listed input to the first lexical stratum, while the component morphemes of such complex idiosyncratic forms are analyzed by morphological generalizations acting as redundancy rules. Given that at least morphological redundancy-rules can be independently motivated in the lexicon, it is possible to dispense with the "deep" strata which now contain fossilized morphological rules. That is, the complex forms presently generated by the application of these rules can instead be given in the same list with monomorphemic roots, while the rules themselves no longer apply to derive anything, but instead merely state redundancies, "parsing" the polymorphemic forms in question. Simultaneously, bound roots can be eliminated from the listed input to the first lexical stratum, since they (and their boundness) are already given via their occurrence within complex forms in the list. Furthermore, once it is established that the lexicon contains morphological redundancy and hence morphological redundancy-rules, there exists independent motivation for lexical redundancy-rules in general, and so the whole notion of phonological redundancy and underspecification must be rethought. However, the latter issue exceed the bounds of the present paper, which--although it treats all types of grammatical idiosyncrasies of words--focuses solely on morphological redundancy.

Since Bloomfield 1933, linguists have generally viewed the lexicon as the repository of linguistic idiosyncrasy: all aspects of a language which are not rule-governed (or part of UG) must be lexically listed. Beyond expressing or implying acceptance of this view, however, generative grammarians have had relatively little to say about lexical idiosyncrasy, although the issue of how idiosyncratic supralexical units like compounds and idioms are properly to be accounted for has been treated as an important one. A concentration on rules--plus a concomitant avoidance of focusing on exceptions--has led most generativists to downplay the issue of lexically idiosyncrastic polymorphemic words in the same way--and for the same reason--that they have downplayed other kinds of minor exceptionality in grammar. And yet such exceptional complex forms provide compelling arguments for revising the currently dominant view of LMP. The crux of the matter is that languages typically have large numbers of words or stems each of the following sort: a polymorphemic form whose overall semantics are not completely compositional but are instead partly a property of the entire morpheme-combination.

The English complex word **dogs**, e.g., contains the two morphemes **dog** 'canine' and **-s** 'plural' and has, among others, the perfectly compositional overall meaning 'canines'--which, in itself, would clearly not require lexical listing for the combination **dog + s**. However, **dogs** also has the idiosyncratic overall meaning 'feet', which is predictably plural (given the presence of **-s**) but still non-compositional because (apparently for most speakers) **dog** does not occur alone with the meaning 'foot'. Hence, even though the morpheme-combination **dogs** contains the regular plural-suffix and has one compositional meaning, that word has an overall semantic idiosyncrasy which requires it to be lexically listed; its exceptionality cannot be predicted from either of its component parts alone. Although **dogs** is perhaps uninteresting as a token because it is an isolated example, it is crucial as an instantiation of a type which has literally thousands of examples in numerous languages--extending in English, via **severance** and **suppository**, all the way up to **antidisestablishmentarianism**.

In current versions of LMP, though, no provision is made for such idiosyncratic complex forms. They have no place in the listed input to the first lexical stratum, since that list contains only single (root) morphemes. But neither can they be derived by the morphological rules of any stratum, since it is not a general fact about English **-s** suffixation that it changes the meaning of a root to 'foot', or about **-ance** suffixation that it adds the meaning 'pay', etc. And, e.g., to complicate the **-s** suffixation rule with a codicil to the effect that it has an exceptional semantic effect when applying to **dog** is tantamount to lexically listing the combination **dog + s**--but much less appropriate, because the idiosyncrasy of **dog + s** surely has as much to do with **dog** as with **-s**.

The solution for these problems of current LMP is to expand the listed input to the first lexical stratum so as to include idiosyncratic polymorphemic forms like **dogs**--and, concomitantly, to allow productive morphological rules like **-s** suffixation also to function as redundancy rules parsing such forms. Once lexical redundancy-rules are motivated in this way, however, fossilized morphological rules like those suffixing **-dom**, **-ric**, **-th**, etc. in English can be reanalyzed as generalizations which exist only as redundancy rules--and the stratum formerly containing them entirely eliminated. Similarly, the bound roots which were formerly listed in isolation can now be eliminated as well, since the complex forms in which they occur are always idiosyncratic and so already occur in the input list. Such an approach utilizing redundancy rules and lexical listing of exceptional complex stems can also rid current LMP of the ordering problems posed by words like English **untruth** (where fossilized **-th** suffixation apparently follows productive **un-** prefixation) and of the problematic double marking in words like **knives** (where the "Elsewhere Condition" is apparently violated by suffixation of regular/general plural **-s** to a stem **knive-** already irregularly/specifically marked for plural).

The benefits of morphological classification: On some apparently problematic clitics in Modern Greek

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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 pieces 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 Wackernagel's Law) that sentential clitics occur in second position within their clause and the claim that there are no endoclitics, i.e. clitics that are positioned within the morphological unit defined by a word.

Recent work by Zwicky (most 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 monostratal 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-noticed 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 me, 1SG GEN mu, 3SG ACC NTR to, etc.) and "particles" (the modal markers na and as, the future marker θa, and the negation markers ðen and mi), e.g. in such verbal complex expansions as:

1.	ðen	θa	mu	to	ðósun	'They won't give it to me'
	NEG	FUT	1SG.GEN	3SG.ACC.NTR	give/3PL	
2.	as	mi	mu	to	ðósun	'Let them not give it to me!'
	MOD	NEG	1SG.GEN	3SG.ACC.NTR	give/3PL.	

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

Evidence from Standard Modern Greek, in the form of semantic and phonological irregularities, is brought forth here to show that these elements are all, by the above criteria, affixal in nature. Furthermore, dialectal evidence, in particular the occurrence of such forms as Thessalian (and general Northern) Greek pé-m-ti 'tell-me-PL' (meaning 'you/PL tell me!'), with a so-called "clitic pronoun" (-m-) inside of the plural imperative affix, and the Tsakonian synchronically unanalyzable negative auxiliary ón'i/ósi... 'I am not/you are 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 for claims regarding clitics universally, turn out, once a stringent set of classificatory criteria is applied to the data, to present no problem and to be instead rather 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 embodied 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.

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

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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 to at least 1956 (Chomsky, Halle & Lukoff, 1956) with the postulation of the transformational cycle. Further refinements included the Principle of Strict Cyclicity (Chomsky, 1973, Kean, 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 effectuated 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 would like 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 dissappear if different assumptions are made about segmental representations and the exact nature of the mechanisms that underlie phonlogical 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 postion 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 sõn ami 'his friend' as well as "compositional vs. non-compositional compounds: nõn-arrosage 'non-watering' (?non-arrosage) vs. non-avenu (*nõn-avenu). I will continue by exploring several cases (Morrocan 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 in prospect and retrospect

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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 an 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?

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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 (MSR's) were first proposed by Halle (1958,1959, 1962) and Chomsky (1964). Arguments were later proposed by Stanley (1967) and Lightner (1963) to weaken the rules to a set of constraints (MSC's). The arguments also indirectly weakened interest in lexical redundancy. As Anderson (1985, p. 326) notes"...a concern for 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 strutural conditions."

Assuming a purely syllabic set of lexical redundancy rules accounts for the varying acceptability of forms such as brick, blick, and bnick, 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/:

*lemd *[...md]

bimorphemic /md/ does exist:

screamed [[...m]d]

Other examples of bimorphemic "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 bimorphemic "exceptions" to place assimilation:

dreamt [...m]t]

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 MSR's.

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: MSR's and Syllable Structure Constraints (SSC's).

The primary consequence of adding MSR's to the model would be an additional domain of cyclic rule application. The other consequences are more subtle. By ordering MSR's before SSC's UR's would not need to be exhaustively syllabifiable. This would provide an explanation for surface canonical disparities between the outputs of MSR's and SSC's. 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 MSR's creates a new role for syllabic rules: SSC's would be able to destroy or make opaque existing MS as well as to build metrical structure. SSC's would operate as a conspiracy of rules which aligns MS to acceptable syllable structure. This argument can be extended to provide an expanation for lexical change. Although synchronically there is little interaction between MSRs and SSC's, 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 UR's of bomb and comb).

On the metrical structure of Japanese downstep

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Poser (1984) proposes the 'catathesis' model to account for the tendency of F0 contours to decline during the course 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.

The interfaces between phonetics and phonology

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THe nature of the interface posited between phonology and phonetics depends on the purpose of the linguistic description being made. Consider:

1. the phonology of a single language needing only the notion of distinctive features;
2. a phonology permitting comparisons between rules or patterns observed in different languages, the description of each language being in terms of a set of universal features;
3. a comparative phonology that also specifies differences between the sounds of one language and another, thus requiring additional phonetic elements that are never contrastive within a language.
4. a phonology which is part of an account of how the mental concepts of words and sentences become gestures of the vocal organs.

Phonologies of type (4) are incompatible with those of other types.

Bengali emphatic clitics in the lexicon-syntax interface

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In Bengali, the clitic element o corresponds 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)"
beat- [1sg]- even
b. mar - ch - i - o "(I) am even BEATING (him,..)"
beat [progressive] [1sg] even
c. mer - e - o - ch - i - l - am "(I) have been even
beat [?] even [prog.] [link] [past] [1sg] BEATING him"

In (c), [o] can slip inside the word, but it cannot do so in (1a,b): *mar-o-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 affix /cch/ (where c=unasp. affricate and ch=aspirated affricate)

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

The initial affricate is always retained when following a vowel-final stem, since it can close the preceding syllable (cf. khac.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 outside 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 derivative 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 /o/ to be attached to it - mar-a-cchi-o, not *mar-a-o-chi.

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

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. *my even dog). 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).

Morpheme decomposition in compounds

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This paper presents an experimental investigation of morpheme decomposition in the visual recognition of English compounds. It reports on a series of three experiments and discusses the role of compound recognition in the formulation of hypotheses about lexical access and representations.

In the first experiment it was found that existing compounds such as "warehouse" appear to be represented in the mental lexicon as morphologically-complex full forms. On the other hand, novel compounds such as "winehouse" appear to be decomposed into their constituent morphemes in the process of visual word recognition.

The finding that novel compounds are decomposed in visual recognition raises the question of the actual processes involved in decomposition. Compounds differ from affixed words in that morphological decomposition cannot be accomplished by the identification and removal of affixes from stems. Because both members of a compound may be open-class words, decomposition can only be accomplished by means of a parsing algorithm. In the second and third experiments reported in this paper, it was found that the constraints of English orthography play a significant role in the determination of parsing choices for novel compounds, but that the locus of the orthographic effect appears to be post-lexical.

The results of this study of compound recognition point to a view of the mental lexicon as a self-reorganizing store of knowledge, which is characterized by flexible and cost-free access.

Short vowels in Germanic

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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 o 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 monophonemic and monomoric, were the locus of movable stress (géolc > yelk, geólc > 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 is 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

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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 (F_o) 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 F_o 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 F_o contours from those on the final /do/ syllable.

Phonetic content in phonology

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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.

Now then, how "natural" must phonological theory become to deal successfully with the traditional division of labor between phoneticians and phonologists? The present proposal argues for a radical answer: To solve the theoretical problems at the phonetics / phonology interface in an explanatorily adequate way it will be necessary to reject and turn around one of the time-honored doctrines of our discipline: The logical priority of linguistic form over substance (de Saussure, Chomsky). Understanding phonology means being able to derive it from non-phonology.

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On the universality of the laryngeal tier

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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 posited presence 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 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 Sagey (1986) aims to capture generalisations 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 continuant and noncontinuant 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 characterising 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 glottalic consonants of Hausa or the creaky vowels of Sedang) are taken to require features irrelevant to the phonology of languages which lexically 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 commonly be so impoverished. Pitch features which are specified lexically in 'tone languages' (characterising e.g. high versus low tones, register distinctions, boundary tones and peak alignment phenomena) are found to occur non-lexically in pitch accent systems and in intonational systems such as those of German and English. Likewise, voice quality features must be specified non-lexically in many languages, not only to characterise 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 demarcative functions. Pre-glottalisation 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 utilised 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

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1. The behaviour of the clitics in Modern Greek has been held to support controversial claims. In particular:
a) In Kaisse 1977, 1982, 1985 the minimal claim 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 1985 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 N+stop 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 1983/85 model of Lexical Phonology without the need for further hypotheses (Cf Booij-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 Aorist Imperative suffix (e.g., par-ete -> par-te "take!") may also be triggered by addition of a clitic (pare-to -> par-to "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 "stress-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".

From pragmatic strategies to case markers: Romanian clitics

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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, l-am văzut ieri lit. '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 hier) (the clitic is a copy of the topicalized d.o.) and l-am văzut ieri pe tata lit 'have-I seen yesterday PE-preposition father-the-acc.', 'I saw (my) father yesterday'(the clitic 'introduces' the postverbal d.o.). The phenomenon is explained as a means of eliminating the ambiguity between subject and direct object which may arise due to the synchretism between nominative and accusative and to an almost equal probability of SV and VS order: comp. copilul care l-a văzut lit 'child-the-nominative who-nom.-or- acc. him-acc. has-he seen', 'the child who saw him' and copilul pe care l-a văzut lit. 'child-the nom.-or-acc. PE-prep who-acc. him-acc. has-he seen', 'the child whom he saw'.
(b) by a clitic pronoun and a definite article (indirect object):
comp.i-am spus, mamei lit 'her-dat. have-I told mother-dat.-the-dat.fem.-sg.', 'I told her, to my mother'(mother is the anti-topic) and i-am spus mamei 'I told my mother'; or spoken Rom i-am spus lu mama lit 'her-dat. have-I told LU (invariable definite article - similar to preposition markers) mother-the-acc.', 'I told my mother'. In this case, the synchretism between dative and possessive 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 A marks the difference between genitive and dative: comp. dă cartea aceea copilului lit. 'gives-he book-the-acc. that child-the-genitive-or-dative', i.e. 'he gives that book to the child'and dă cartea aceea a copilului 'give that book of the child'.

The deviant character of these case markers is accounted for in terms of the conflict between two divergent 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

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In his contribution to the ICL-workshop on word-formation Motsch broached the time-honoured topic of the rôle 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

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The first part of this talk is devoted to a discussion of experiences with morphological[1] 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 compex 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.

Willem Meijs
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[1] The term 'morphology' is here throughout meant in a wide sense, to include word-formation as well.

On natural and unnatural phonology

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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 Paiute). Consonant metatheses occur when the single sonority peak requirement of a syllable is threatened by a particular sequence of consonants (examples will be drawn from Zoque, Cairene). Palatalization, labialization and nasalizations are also forced by accomodations 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 properties of the former, 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 accomodations 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 nonrecoverable deletion in syntax. Syllabic accomodations in Semitic languages are made through vowel epenthesis rather that consonant deletion. The syllabic accomodation is phonetically driven. The fact that it is done by epenthesis rather than deletion is lexically driven. Similar lexical and syntactic conditions on phonetic accomodations 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 phontically 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.

Parasitic formation in inflectional morphology

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Exponence models for inflection normally postulate that the phonological representation of each inflected form of a lexical item is DERIVED 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 'stem' from another 'stem' 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 Participle by the suffixation of *u:r*". This means that a grammatical representation [+F_1] which does not contain a certain bundle of features [+F_2] may nevertheless trigger the rules of exponence for [+F_2]. Matthews (1972:175-182) suggests a formal mechanism of parasitic formation – a loop in the derivation – which at one point alters [+F_1] so as to add the feature [+F_2].

Although not specifically discussed, such parasitic formations are also required in recent exponence models (Anderson 1977, 1982; Zwicky 1986, 1987). In particular, I examine the case of Marais Vendéen French, where, e.g., 1pl pres. subj. [nɔ̃dwɛʒɔ̃] '(we) clean' and 1pl past subj. [nɔ̃doʒɔ̃] have the same underlying morphemes: stem /nɔ̃doj/, subj. /ʒ/ and 1pl. /ɔ̃/; 1pl pres. subj. is derived from the 1sg pres. subj. [nɔ̃dwɛʒ] < /nɔ̃doj+ʒ/ where /oj/ is regularly realized [wɛ] before consonant in word-final position and 1pl past subj. is directly derived from /nɔ̃doj+ʒ+ɔ̃/.

I propose that parasitic formations are specific instances of a morphological operation corresponding to CONVERSIONS in derivational morphology. Inflexional conversion generalizes the concept of RULES OF REFERRAL 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, Kiparsky 1982) and lexicon-external inflection becomes less significant, as many exponence rules may be reinterpreted as inflectional conversion rules which introduce new selectional rules.

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Problems of word structure theories

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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 -> Y X

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 are by no means restricted to pure affixation. As MAYERTHALER and DRESSLER, among others, have demonstrated, several different techniques have to be taken into account which may be ordered in a scale of degrees of naturalness (Konstruktionsikonismus). In general, it can be argued that the kind of analysis involved in natural morphology provides a theory of markedness which accounts for 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.

Why don't Hindi speakers make speech errors?

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In a prior paper ("The scarcity of speech errors in Hindi", in Hyman & Li, eds., Language, Speech and Mind) we have attempted to document that native speakers of Hindi never (or rarely) make speech errors. Although common in many other languages, speech errors of the type which involve a fragmentation of words into phonological sub-parts, e.g., 'crogged freeways' (for 'clogged freeways'), have so far not been observed naturally in the speech of Hindi speakers when they speak Hindi (even though, like the above example, they may make such errors when speaking English). We found, however, that such errors can be induced experimentally using the technique developed by Motley and Baars (Communication Quarterly, vol. 24 (1976)). But even in this case the incidence of these errors seemed to be much lower (3.4 to 5%) than that reported when the technique was used with speakers of English (10 to 40%). We speculated that unlike the languages in which speech errors are common, Hindi may have a "flat" (non-hierarchic) prosodic structure and this may somehow account for the different incidence of word fragmentation errors. (Typically the parts anticipated, perseverated, or exchanged in speech errors get fitted into some other place in the utterance having the same or similar hierarchical position: stressed syllable to stressed syllable, syllable onset to syllable onset, etc., e.g., 'it is kistomary to cuss the bride' for 'it is customary...' but never *'it is customass to curry...')

In this paper we report the results of further refinements of the induced speech error study including one which attempts to test the hypothesis that prosodic structure plays a role in the incidence of speech errors. First, we attempted replicate our earlier study which was done using orthographic stimuli, this time with audio (tape recorded) stimuli. Second, we used Motley and Baars' 'priming method' (as opposed to their other method which we used in our earlier work which involved having subjects repeat two word phrases either in the same order or in reverse order, according to a random schedule). Third, in order to be sure that the incidence of induced errors is less in Hindi than in English we administered the same technique to bilingual subjects in separate Hindi and English sessions. Fourth, to explore further the role of prosodic structure in speech errors we conducted a test with English speakers to see if errors can be induced more readily with word pairs having similar prosody as opposed to those with dissimilar prosody. That is, is it the case that the stimulus 'cannibal majesty' is more likely to be permuted into 'mannibal cajesty' than the permutation of 'cannibal matinee' into 'mannibal catinee'?

Polish yers in non-linear phonology

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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]a, vs. [bɛs] - [bz]u, [tɕɐn] - [tɕɐn]a, vs. te[ren] - te[ren]u) 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 yers. The rule called LOWER (Gussmann 1978,1980) deletes the last occurences of yers 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 yers, 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 V-s in a string. This solution crucially makes again use of the deletion rule by encoding the occurences 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.

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Morphonology in the development of sentence understanding in Hungarian children

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During the last years several sentence interpretation experiments were performed by the author on Hungarian children to clarify the ease of sentence processing in children as a function of the different stem types in the Hungarian nominal paradigm. In the experiments stems that form the accusative by putting the -T case marker directly on the stem /mókus - mókus-T 'squirrel' /, and ones using a linking vowel /ház - ház -a-T 'house' / have mainly been used in sentences with different word orders.

Three main effects of morphonologival variations were shown:

- difficult to process accusatives were frequently misheard as nominatives
- the missing accusative is added sometimes to consonant final stems
- similar sounding other grammatical morphemes /like the possessive -D / are sometimes misheard as accusatives.

All of the effects had a clear interaction with word order: sentence initial nouns were misheard as nominatives and sentence final ones as accusatives if the stem allowed for this.

The results will be interpreted with reference to the prototypical sentence schema in Hungarian children and the role of morphonology in its buildup and the possible relationships between learning the productive rules of morphonology and the use of stem type information in understanding.

Automatic morphological analysis of agglutinative languages

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Gábor Proszéky - no abstract received

Phonology and speech perception: The case of nasal stops

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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 /g/ 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 (Kurowski 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 depende 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 /ɲ/ 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.

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Areal features and diachronic phonetic universals

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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 types of change can indeed be explained on an experimental phonetic basis, in terms of performance factors having to do with speech production and/or perception. It is, however, essential to note that although several of the putative phonetic explanations of change work in terms of *simplification* in a broad sense (loss of structure, assimilation), this is certainly not true in general; on the contrary, *dissimilatory* phenomena of some kind often crucially enters the total, complex explanation.

Tonogenesis of the type trading syllable initial consonant distinctions for tones is (since Matisoff, 1972) often taken to be a clear-cut example of sound change dependent on a universal phonetic principle. Such tonogenesis is explained with reference to the apparently 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 casu* a feature found in 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

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Local deviations from the output of metrical algorithms are standardly encapsulated through the device of "extrametricality" (Nanni 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, number 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 (Damascene 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

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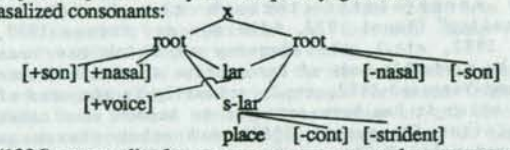
This paper proposes that prenasalized consonants are represented in the feature hierarchy framework of Clements (1985) as two root nodes dominated by one skeletal point. Furthermore, this paper proposes that [son] along with [nasal] (from Piggott, 1987) are linked directly to the root node. The features [cont] and [strident] link directly to the supralaryngeal 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 [αF] and [-αF] 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 obstruent. 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 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 surfaces when prenasalization does not occur, i.e., when the nasal is followed by a vowel. For example /ŋ/ precedes a vowel in Ndali (Vail, 1972) where prenasalization is expected. The independent root node is required regardless of whether the features for /ŋ/ 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)

post-nasal voicing:	/iN- puno/	[i^{m}buno]	'nose'
post-nasal hardening:	/iN-βale/	[i^{m}bale]	'plate'
nasal deletion:	/iN- satu/	[isatu]	'python'

This paper assumes nasals are redundantly specified as [+voice] and [-cont]. Since Ndali stops are [+voice] only post-nasally, then stops are not lexically specified for [voice]. Similarly, since /β/ is the only voiced fricative in Ndali, then it need not be specified for [cont]. 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. Fricatives such as /s/ 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 the nasal deletes.

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.

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Sagey, E.C. (1986) *The Representation of Features and Relations in Non-linear Phonology*, doc. diss., M.I.T.

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How syntax becomes morphology

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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 synchronic 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				
		unstressed		**stressed**		
N		INFL		N		
|		|		|		
DAT	ACC	DAT	ACC	DAT	ACC	(2)(a) Italian
mihi	me	mi			me	
tibi	te	ti			te	
sibi	se	si			se	
illi	illum	gli	lo		*egli/lui	
*illae	illam	*le	la		ella	
		me		mí		(2)(b) Spanish
		te		tí		
		se		sí		
		le	lo		él	
			la		ella	

It must be assumed that the mechanism responsible for the variation in Romance is already in progress in Latin. In fact the Latin personal pronoun system is ambi-categorial, 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 form **illae** in Latin as well as for the gender synchretism in the Spanish dative **le** and in (popular) Italian **gli.** I will show that the phenomena of **leísmo, laísmo and loísmo** in Spanish also follow from principle (3) as an instance of case synchretism. 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/me** (cf.2avs.2b) 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

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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 tipical 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

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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

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Most of the Indo-Aryan languages make liguistic 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 or 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 (Browman & Goldstein, 1986).

Modification of strategies in feature extraction

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Natural speech remains understandable even if destroyed in large parts. One of the reasons for this lies in the fact that most phonological oppositions consist of a considerable number of concomitant phonetic properties. This fact enables listeners to come to the same results in sound identification, although they apply different strategies of processing the acoustic signal.
Given the fact that in each case more than one property serves to distinguish between sounds, the question arises in how far the individual properties guide the identification process and in how far the inability to recognize certain properties may be compensated by other features also contained in the signal.
In order to answer the question to what extent diminished cues can be compensated by other co-occuring features, it is necessary to vary the individual parameters systematically and independently from each other by digital computer programms, and to use the modified speech signals in perception experiments and training procedures. The aim of an auditory training is to maximize the amount of information listeners can extract primarily from the stimuli reaching them through the auditory channel. First results are presented.

On a universal criterion of rule coherence

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One of the factors that commonly retard progress in linguistic theory is a kind of amnesia affecting its practitioners, whereby well-grounded, highly productive 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 theorie 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 semiotic 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 concept of rule was not prominent among the theoretical advances of the early European structuralists, it is nonetheless clear that its ubiquitousness 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 postwar 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 markedness. Coherence obtains when rule relations express the mirroring of markedness values across content and expression levels, or between different aspects of expression (as in the case of some morphophonemic congruences). Since patterning is present at all levels of grammar, to the extent that the linguistic rules expressing this patterning reflect congruences of markedness values, we can attribute their coherence (their raison d'être) to such cohesions, and we can do this uniformly in virtue of the isomorphism of grammar. Nothing proves the validity of this universal notion of coherence better than linguistic change. The drift of a language involves the actualization of patterns that are coherent and the rejection of those that are not in just this sense.

An integrated hierarchical system of place features

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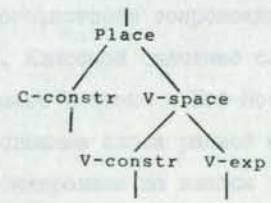
In 1968 when Chomsky and Halle introduced their new system of distinctive features, the new features introduced a dichotomy between vocalic and consonantal features that had not existed in the older system of Jakobson, Fant and Halle.
The feature system was, however, improved by the equation of vowel features and features representing secondary articulations of consonants, which had previously been represented by quite different features. Now these secondary articulations were represented in the same way as the corresponding vocalic articulations.
The problem with this solution was that although a whole class of articulatorily based assimilation processes became expressible in a natural fashion, a whole class of acoustically based assimilation processes became unexpressible in any natural fashion. These are the frequent processes involving rounded segments and labials (and sometimes velars), and those involving palatalized segements (including front vowels) and coronals.
Attempts have been made over the years, from Venneman and Ladefoged (1973) to Sagey (1986), to incorporate the relationship between rounded segments and labials into the existing feature system, principally by redefining introducing a feature (labial) to refer to both types of segment. This is an undesirable step however, as it undermines the logical basis of the feature system which was for Chomsky and Halle that each feature corresponded with a separate phonetic parameter, and that had its own articulatory and acoustic effect.
In the system we propose, which is a variation on the hierarchical model suggested in Clements (1985) and Sagey (1986), a new distinction is introduced between terminal and nonterminal nodes. This will only be discussed with reference to the Place nodes, it may well be generalizable to other portions of the segmental hierarchy. In short our suggestion is that nonterminal nodes represent aspects of the articulation, while terminal nodes represent acoustic features. Another aspect of our suggestion is that the lack of freedom as regards the relation between terminal and nonterminal nodes be given up.
What this last refers to is the fact that, for instance, the terminal node (+/-.round) can only be located under the nonterminal node (labial) in Sagey's model. It cannot stand in a direct relationship with any other nonterminal node.
Our suggestion involves the following hierarchy of nonterminal place nodes:



These are combined with the single-valued terminal feature nodes (I, U, A) in various combinations to express the various articulations. The acoustic effect of (I), (U), and (A) remains more or less the same in combination with the various nonterminal nodes, but their articulatory interpretation changes depending on which node they are attached to.

Experimental Phonology: the case of rhotacism

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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.

Skrytaja morfologija

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Языки разной типологии /одни меньше,другие больше/ используют особые "скрытые" способы выражения морфологических значений слов: морфологических значений категорий и значений классов и подклассов слов.Эти скрытые способы выражения морфологических значений могут быть названы скрытой морфологией. Под скрытыи морфологические явления может быть подведено несколько разных случаев.

Первый случай. Морфологическое значение слова выражается не собственными формами данного слова,а формами подчиненного ему слова.Появление форм у подчиненного слова индуцируется значением главного слова.. В немецком языке таким образом употребляются артикли при именах существительных /и прилагательных/. Появление той или иной формы артикля при том или ином существительном целиком зависит от имени существительного.В русском языке таким образом употребляются прилагательные и местоимения при неизменяемых словах. Появление определенных форм у подчиненных слов индуцируется собственным значением неизменяемых существительных. Такое же употребление форм подчиненных слов для выражения морфологических значений главного слова отмечено в языках Дальнего Востока и Юго-Восточной Азии.В кхмерском языке,например, значение множественности существительного выражается формой повтора прилагательного,которое сопровождает существительное.

Второй случай. Классное значение слова выражено в структуре слова. В языках Дальнего Востока и Юго-Восточной Азии широкое распространение получили сложные слова разной структуры.Распределенность этих структур ориентирована на классы слов: определенные классы слов обладают сложными словами определенной структуры. Классное значение сложных слов тем самым скрыто выражено в структуре.

Morpholexical phonology

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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 betweem 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. However, 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

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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

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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 fenn '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

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Based on the theoretical and methodological tenets of "Phonology as Human Behavior" introduced in Diver (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 stricture (aperture) and airflow as opposed to "manner of articulation";

with regard to:

(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

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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. V̆CCV', s: austere, mystique
II. V̆'CCV, s: aster, mustang
III. V̆'CCV, s: Easter, cloister
IV. V̄CCV', non s: Madrid, agree
V. V̄'CCV, non s: metric, Chaplin
VI. V̄'CCV, 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, aus-tere, and au-stere. 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 /ɔs-ɔstir/ when asked to repeat the first syllable of /ɔsti'r/ and /ɔstir-stir/ 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.

Phonological diachrony, typologies, and universals

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The main goal of diachronic phonological studies is the development of a general theory of phonological change. Such a theory has to make reference to phonological universals of various sorts, chief among them strict universals which delimit the range of variation of both phonological systems and phonological change, and universals of linguistic quality which characterize phonological structures as better or worse (more or less strongly preferred) on certain phonological parameters, thereby determining the direction of phonological change. Phonological typologies are applications of general theories of phonological systems and of phonological change. Two sorts of typologies have to be distinguished. The first establish criteria for classifying languages (and their varieties) for practical purposes; such typologies have either a heuristic or a demonstrative function. The second classify phonological change types according to their motivations with the goal of producing a closed catalog, thereby characterizing the notion of possible phonological change.
My paper will pursue two objectives. First, it will discuss in detail the concepts provided by the conference organizers in the title of this section of the conference, namely the concepts whose relationships to each other I have merely touched upon in the above outline. Second, it will report on recent and ongoing research in these domains, with special attention paid to the role of phonological universals and of phonological change typologies in linguistic reconstruction.

Relations between phonological and morphological patterns

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Tallinn

1. Treatment of morphology can be word-oriented or word-form-oriented.

The word is a general unit and its morphological properties manifest themselves via its paradigm. The morphological pattern (MP) of the word is defined as a complex of morphological properties characterizing the different possibilities of forming a paradigm: the choice of the formative variants, stem changes, the arrangement of stem variants in a paradigm.

The word-form is a member of the paradigm of a word. Its morphological properties are encoded in its phonological shape. The morphological pattern (MP) of the word-form includes the corresponding word and the set of grammatical meanings.

2. The phonological pattern (PP) includes morphologically relevant properties of a word or a word-form: the number of syllables, accent, final and inner phonemes. In the word-oriented morphology we describe the PP of the base form - it may be one of the word-forms, one of the stem variants, or a special form (without real equivalent in a language).

3. We can observe quite a strong correlation between phonological and morphological properties of linguistic units (PP --> MP). However, besides strict relations there is a large number of ambiguous relations, such as "many PPs --> one MP" or "one PP --> many MPs". As a rule, there is one predominant relation PP ==> MP and some secondary relations PP :::> MP.

In the word-oriented morphology this matter enables us to predict quite probably how the words with certain PPs are inflected. If the strict or predominant relation PP ==> MP is valid the words belong to the domain of an active morphology versus passive morphology characterized by secondary relations PP :::> MP.

In the word-form-oriented morphology the correlation PP --> MP makes it possible to analyze word-forms. In case of "one PP --> many MPs" we have to deal with morphological homonyms. Selecting the predominant relations PP ==> MP we can enhance the probability to recognize the "right" MPs for homonymical word-forms.

4. The main sources of the word-form homonymy in Estonian are the homonymy of morphological formatives, various stem changes, and different segmentations of word-forms. The PPs of word-forms having the greatest load of homonymy will be analyzed.

English compounds in Italian: The question of the head

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At least since the second half of the past sentury, 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 pop and beauty, on the basis of the models 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, specificially, 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 (1), where the head is underlined.

(1) (a) N + N : cable television; crocevia 'intersection', capostazione 'station master'

(b) A + N : blue jay; altopiano 'plateau', giallo lemone 'lemon yellow'

(c) N + A : colorblind; ? , cassaforte '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. Specificially, 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), Gigi (< 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 proposed 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

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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 faiblesse 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 illustreront 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

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There are certain morphemes which linguists feel are neither proper roots, nor proper affixes, eg psycho-, bio-, -crat, -nik, -athon. 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

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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.

Vowel harmony from a universal point of view

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The main topics of my presentation are the following ten:

(1) How can vowel harmony (VH) be defined? What are the universal requirements that a phonological phenomenon has to fulfil to be classified as VH? I give half a dozen such requirements.

(2) What are the main types of presenting VH in phonology? Is it remote assimilation between vowels, a morphemic feature, a phonological long comconent, a special type of archiphoneme, or what?

(3) What are the main types of VH in respect to the vowels involved? Here I deal with three types: the VH of tongue frontness, tongue height, and lips.

(4) What are the main types of VH in respect to the direction of assimilation? I give examples of the three main directions: progressive, regressive, and the dominant-recessive type.

(5) What are the geographic distributions of the main types of VH? I present a diagram showing the distributions of the main types in the European-Asiatic area (Uralic and Altaic languages) and in the African area.

(6) What is the relationship of VH to consonant palatalization (as e.g. in Slavic languages), emphatic consonants (as in Arabic languages), and vowel reduction (as in Germanic languages)?

(7) What are the ways for VH to get started, how does it get weakened, and how does it die out?

(8) How is markedness theory involved in VH?

(9) Which is more unmarked: a language with VH or one without it? Here I refer to baby talk and aphatic speech and give statistical information on VH.

(10) In the VH's of various languages there seems to be a universal tendency in relation to the quality of the vowels involved: The more marked a vowel is, the greater its "power" in VH. By "power" I mean here either the power that a vowel has as an assimilator (e.g. it is more natural to have VH after ö than after ä in progressive VH) or the power it has when resisting VH (e.g. it is more natural to have VH in which a is assimilated than VH in which o is assimilated).

Perceptual learning of systematic vs. unsystematic foreign accents

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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 memorizing 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 systematicity/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 a fictitous 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.

Wingstedt, M. & R. Schulman (1987). Comprehension of foreign accents. In: Dressler, W. U. (ed.): Phonologica 1984. Cambridge: CUP.

Radiographic and model studies of tense and lax vowels

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Usage of the concept of tenseness is ambiguous regarding the physiological activity that might be involved and confusion between tenseness and quantity. Tenseness has also been associated with voice quality modulation. Tenseness refers to muscular activity and is thus related to the magnitude of manoeuvres, to articulator positions and to the tuning of vocal tract resonances. A tense-lax articulatory contrast must be reflected in a timbre contrast. On the other hand, tenseness is only sometimes related to quantity or voice quality.

Analysis of manoeuvres from x-ray films reveals consistent differences of both degree of constriction (by the major tongue manoeuvre narrowing the palatal passage, velar passage, upper pharynx or lower pharynx respectively, depending on vowel class) and pharyngeal width (associated with the position of the tongue root) between tense and lax vowels. In addition, there are differences of lip position (more rounded or more spread, as the case may be, for tense vowels) and larynx position (more depressed for tense vowels, especially rounded). The tongue blade is usually more depressed in tense vowels.

This paper reports experiments designed to assess how much of the spectral contrast within tense-lax pairs can be attributed to each individual component manoeuvre. Mid-sagittal profiles of the vocal tract were systematically manipulated in order to reproduce the desired manoeuvre, and the resonance modes for each new configuration were then computed.

For contrasting pairs in three of the vowel classes (palatal [ɪ-ɪ], [e-ɛ]; velar [u-ʊ]; low pharyngeal [ɑ-a]), the difference in degree of constriction gave a substantial contribution to the F2 contrast. For the rounded pairs [u-ʊ] and [o-ɔ], there is a similar contribution from the difference of lip position. Both these parameters require, and get, precise motor control and efficient compensation loops to ensure the necessary accuracy. In no sense is the lax member a sloppy version of the tense member. It is recommended that tenseness should not be regarded as synonymous with quantity or voice quality. Any language specific complementary relationships between these properties can be handled with redundancy rules.

The mechanism of inflection: Lexicon representations, rules and exceptions

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Let us assume that inflectional morphology is a (sub)component of the lexicon. In the dictionary of the lexicon words are listed in their basic forms. Words with unmarked inflectional class membership (e.g. the German feminines with (e)n plural) have no explicit entries of inflection; words with marked class membership (e.g. German feminines with e 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 tis inflected form.
The presented inflectional mechanism allows not only a differentiation of regularly unmarked and regularly marked inflection but also an adequate description and integration or 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 [ns/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 Floß and Kloster that have plural umlaut).

Word formation and inflection

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It is a long-standing issue in morphology whether there is a clear-cut distinction between derivational and inflectional affixation. In this paper I want to argue that there is such a distinction.

I will furthermore argue that the best way to account for this distinction in a generative framework is to combine certain aspects of the morphological analysis of inflection proposed in Selkirk 1982 with certain aspects of the syntactic analysis proposed in Anderson 1982. Each of these two analyses taken separately turns out to be unsatisfactory. Only the combination of elements of the two analyses can account adequately for the morphological and syntactic properties of inflection.

Selkirk's analysis allows for significant morphological generalizations over derivational and inflectional affixation, and indeed more generally over word formation and inflection. But her distinction between the two kinds of affixation is based on stipulation without any explanatory power. And in fact she doubts the possibility of an unequivocal distinction between the two.

Anderson, on the other hand, comes up with a syntactically motivated distinction between the two kinds of affixation. But this leads him to a model of the grammar which separates the two in such a way that it is impossible to generalize satisfactorily over their common morphological properties.

I intend to show how the combination of elements of the two analyses can do the job adequately.

I will finally reconsider the relation between morphology, syntax and lexicon in light of the analysis I propose.

Inflectional morphology as a (sub)component of grammar

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There are three aspects to the description of inflectional morphology (IM):

distribution: Where can formatives 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 theoreticians 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 (Engl. 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 inflectional affixes.