ESCOL '89

Proceedings of the
Sixth Eastern States Conference on Linguistics
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On Looking into Words

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1 Introduction: What’s in a Word?

The concern to be addressed in this paper is a rather fundamental one: What do we find when we examine the internal form of a word? That is, when we consider the form of a word, what kinds of structure ought it to be taken to have, as a matter of its form? There is a tendency in doing linguistic analysis to assume that any information we can supply about linguistic elements constitutes a kind of “structure” that they have, but this clearly conflates several distinct notions. For instance, in discussing the word rear (as in When Trigger reared suddenly, Roy Rogers fell off), we can note that its source is Middle English *rear*, Old English *rearan*; and that it is related to modern English *rise* as one of the few remaining pairs of English words illustrating Verner’s Law. Surely, however, we would not want to say that this information is part of the structure of the word rear in the way that, e.g., the organization of its phonological content into segments and syllables surely is. Information about the etymology of a word is properly given in the form of a description of its history and derivation from earlier forms; information about segmental and syllabic structure, on the other hand, is simply one aspect of the form or internal organization of the word itself.

Consider a representative English word—say, the word cut. This word clearly has an aspect represented by an analysis of its sound: perhaps [kʰʌt] (with appropriate autosegmental and metrical structure). Another aspect of the word’s structure is an account of its meaning: perhaps “A carnivorous mammal (Felis catus) long domesticated and kept by man as a pet or for catching rats and mice.” Furthermore, we have not given a full account of what a word is until we have described its syntax: in this case, by saying that cut bears the categorial property [Noun] or perhaps some other combination of specifications that amounts to the same thing. Since a word is an association between sound and meaning that fills some syntactic function, this much is irreducible. The question is whether any of the other things we can say about words ought to be treated as a matter of their internal structure.

There is one prime candidate for such additional structure. Since early in the structuralist period, it has been assumed that (independent of their phonological

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1Since I have no serious theory of what the semantic representation of a word ought to look like, I will allow this citation from Webster to stand in place of one. While ordinary language paraphrases are surely not a very good formalism for semantic form, they are probably as good as things like “CAT”.

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Invited Speaker.
organization) words are also divisible into morphemes. A theory gradually grew up over time according to which the phonological forms of these elements are separated from one another by quasi-phonological 'boundaries', and organized into a hierarchical structure like a Phrase-Marker:

(1)

\[
\begin{array}{c}
\text{Adj} \\
N \\
N \\
dis + content + ed + ness \\
\text{"discontendedness"}
\end{array}
\]

The precise details of such representations differ from writer to writer, according to whether discontinuous constituents are allowed, just what labels (if any) can be assigned to the constituents, etc. What is essential is that the kind of theory we refer to treats words as having—as part of their internal structure—a decomposition into morphemes, where the morphemes are organized into larger constituents, and eventually into the entire word. Variations on this scenario are represented, for instance, by such views as those of Selkirk 1982 and Di Sciullo and Williams 1987, who treat morphology as the 'internal syntax' of words.

No one would contest the claim that the information presented in (1) corresponds to something that is 'true' of the word discontendedness, but it does not follow from this that the decomposition of the word is an aspect of its structure, any more than its etymology is. To see that there is an issue here, we can contrast such views, based on morphemes, with a picture of morphology as based on a system of rules that map words (or stems) onto other words. Let us call this the 'A-Morphous' view of morphology (an obvious reference to the picture presented in Anderson forthcoming). On this picture, the structure of discontendedness is given by a derivation:

(2) \[
\begin{array}{c}
\text{content} \\
\text{dis} \\
\text{discontent} \\
\text{ed} \\
\text{discontended} \\
\text{ness} \\
\text{discontendedness}
\end{array}
\]

Each step of such a derivation maps the phonology, the semantics, and the syntax of its inputs onto the (corresponding) properties of its outputs. It expresses the same facts as the Phrase-Marker in (1), such as the observation that some of the subparts of the word are themselves words, the relative scope of morphological operations, etc., but without imposing a distinct structure on derived words to represent their morphological analysis as an aspect of their form parallel to their phonological, semantic and syntactic form.

If a structure such as that in (1) does in fact have to be imposed on words, that would presumably constitute an argument for the reality of the constituents of such structures: morphemes. On the other hand, a theory (such as that of Anderson 1988, forthcoming) which dispenses with morphemes as units has as a consequence the claim that such structure will only arise when explicitly stipulated in the structural change of a morphological operation. In the usual case, 'complex' words will have only phonological and semantic structure, together with syntactic properties.

2 Possible Motivations for Word-internal Structure

It might seem that the presence of structure like that in (1) can be motivated as a direct extension of X-structure to domains smaller than the word. This is more illusory than real, however. Zwicky 1980 has recently summarized a dozen or so ways in which word internal structure differs significantly from syntactic X-structure. These include:

1. Alternative possible orderings of constituents are common in syntax, but unknown in morphology.

2. Syntactic constituents often admit optional modifiers, but morphological 'constituents' do not.

3. Syntactic heads often agree in some property with their arguments, or modifiers with their associated head, but there is no parallel between derivational affixes and their associated stems.

In addition to the points made by Zwicky, another important difference between syntactic X-structure and the internal form of words is discussed by Williams 1989, who notes that there is no notion in morphology that corresponds to that of "Maximal Projection" in syntactic structure. As a consequence, a number of other properties of Phrase Markers that are linked to this notion, such as case-marking, predication, reference and opacity also lack word-internal analogues. A related point has been made by Norbert Hornstein (personal communication). Hornstein observes that of the two major relations which play a role in syntactic principles, C-Command and

\[^3^\]

On the other hand, there may well exist circumstances in which words do have a motivated internal constituent structure, for an example of a case in which such structure can be motivated by a combination of morphological and phonological factors, see Anderson 1989. The existence of such examples actually confirms the claim that in the more general case no such structure should be attributed to words, precisely by the difference between words in which the organization into constituents is motivated, consistent, and limited to a small subset of their morphological properties, as opposed to the more general case in which these motivations are absent.

\[^2^\] In addition to the differences between the two domains noted here, Williams also claims that there are many similarities between syntactic and morphological structure. These are said to include (a) the fact that both use concatenation; (b) the fact that both involve free and bound forms; and (c) the commonality of certain notions of a "theory and binding to the two domains. The similarities Williams claims, however, are either so superficial as to be of no value in establishing a putative unity of the two (e.g. the role of concatenation in both), or else more in the nature of analogies than substantive similarities. In order to establish the point that the very existence of X-principles in syntax motivates a similar representation in morphology, it would be necessary to show that the same substantive principles are operative in both areas of grammar. Williams does not undertake that task (since the focus of his article is on a substantive difference and not on similarities), and we do not think that close examination would reveal the kind of detailed resemblance that would be necessary.
Government, it is possible to find analogs of C-Command in morphology but not of Government. Again, the conclusion that follows is that the differences between structural internal to the word and that of phrases are at least as important as the perceived similarities. The proposal that word structure can be represented by “Phrase Markers” does not really support much of a comparison: a Phrase Marker is a rather general sort of object, and it is not surprising that it can be employed to represent (much) word-internal form. Substantive differences between syntactic and morphological structure, however, suggest that no single, unified set of principles (such as those of X-theory) that can be generalized to cover both domains.

The motivation for structures like (1), then, must come from elsewhere in the grammar. In general, any rule that made reference to such structure could serve as the basis of an argument for its linguistic significance. A rule in any part of the grammar, that is, which required reference to a structure internal to a word representing its morphological form would constitute prima facie evidence that such structure must be present. The rule(s) in question might be found in the semantics, in the syntax, elsewhere in the morphology, or in the phonology. We consider each of these possibilities in turn in the sections below.

2.2 Syntactic Motivation

We can then ask whether a rule of the syntax could refer to or alter word-internal morphological structure. This possibility ought to be excluded insofar as the Lexicalist Hypothesis is correct, since the essence of this (at least in the relatively strong variant which has genuine empirical content) is precisely the claim that “The syntax neither manipulates nor has access to the internal form of words.” The Lexicalist Hypothesis constitutes a program more than an empirical result; but it does seem that the only reasons not to maintain it are precisely the morphology-syntax interactions which comprise what is traditionally called inflectional morphology. And in this domain, we can show that the representations common to morphology and syntax should specify the categories expressed by a word, rather than its internal morphological structure per se. Representations such as those in (1) do not do the right work, since the information they contain is both inadequate and excessive for the purpose of supporting the range of morphology-syntax interactions that occur in language.

On the one hand, such representations are too weak to serve as the interface between morphology and syntax, because information about categories expressed by a form may not be borne by any of its morphological constituents. This is the case with morphological categories that are formally reflected by operations such as ablaut, subtraction, metathesis, etc.; and especially for categories expressed by ‘zero’. Of course, a common way to describe such situations is to posit covert 0 elements in the analysis of a form. Pretheoretically, at least, such ‘zero’ elements are simply a way of designating a class of cases in which the formal composition of a word does not match its relevant morphosyntactic content. In occasional cases it is possible to develop arguments that ‘zero’ is a specific element of morphological expression, but in general specific motivation is lacking, and 0’s are posited simply because a relevant category is not overtly reflected in words. Furthermore, in some cases we can show that a generalization is actually lost by such a treatment. In Geogian, for example, third person direct object NP’s are not formally reflected in the composition of their governing Verb. This Verb must nonetheless be treated as ‘agreeing’ with its object in order to sanction phonologically empty pronouns in this position. However, the generalization that exactly one morphological prefix position is available in the Verb for markers of agreement (which is responsible for the otherwise unexplained
fact that certain markers have no phonological content precisely when the position in question is already filled by another marker) would be violated if this agreement were to correspond to an overt 0 marker.

Representations like the one in (1) are also too strong to serve as the interface between morphology and syntax, because they contain information about morphological form which appears to be systematically disordered by the syntax. For instance, the morphological analysis of a word must specify the linear order of its component parts; it must specify whether a single category is reflected exactly once, twice, or at several places within the form; it must include reference to the presence of purely formal, semantically and syntactically empty morphs," etc. While all of this information is obviously essential to an adequate account of the forms or words, it seems reasonable to propose that it should be systematically unavailable to the syntax, since there is no evidence that the syntax ever depends on such matters.

For these reasons, the A-Morphous view of morphology suggests that a Morphosyntactic Representation of the inflectional categories expressed by a form, rather than its formal morphological structure, constitutes the interface between morphology and syntax. For the outlines of a theory of such representations, see Anderson (forthcoming). Many issues remain to be decided, but it is quite clear that the appropriate representation for the information which is communicated between the principles of syntactic and morphological form have a very different character from that of a direct representation of the latter, as would be implied by structures like that in (1). But in that case, syntactic rules will not be in a position to provide arguments for the presence of internal morphological structure of this sort within words.

2.3 Morphological Motivation

Rules of the morphology might provide an argument for word-internal morphological structure if they necessarily depended on or manipulated the (non-phonological) internal composition of words. Now in fact the literature on morphological theory has gone to some lengths in recent years to minimize the extent to which such reference could be made. Constraints such as the Adjacency condition of Siegel 1978 and the Strict Cyclic condition of Lexical Phonology (see Kiparsky 1982, Kaisse and Shaw 1985) have the effect that morphological operations are prevented from looking at or altering any of the internal structure of a form except the result of the immediately preceding operation. Of course, the consequences of that operation are precisely the properties that characterize the input form itself (regardless of its source), and thus the effect of such conditions is to eliminate the possibility that the morphological composition of a form (as opposed to the positive phonological, morphological, syntactic and semantic properties it bears) can be relevant to the way in which rules can operate on it.

We might find evidence for the presence of structure if we had a rule that, say, inserted affixal material precisely between two morphological units. A rule might infix a particular marker precisely before the final suffix (or after the initial prefix) present in its input form. Such rules do not appear to exist, however: rules of infixation seem always to place their affix with regard to material that can be characterized in phonological terms. Infixes thus appear after (or before) a single consonant, a syllable or syllable nucleus, a prosodic foot, etc., but never after (or before) a single affix regardless of its phonological shape. This fact suggests that information about the morphological (as opposed to phonological) constituency of words is not available to morphological rules.

Perhaps the strongest argument in favor of providing morphological structure as an input to morphological rules has been developed in connection with the operation of rules of truncation. Aronoff 1976 proposes that the affix -ate is deleted before some other affixes, such as -able, in words like demonstrable (from demonstrate). Since instances of the sequence -ate which are not affixes are not truncated (cf. debatable from debate), he argues that it is impossible to replace reference to the affix by a purely phonological description. If this argument were to succeed, it would show that truncation rules (can) require information about the morphological structure of words which is not purely phonological.

This argument that truncation is based on morphological and not phonological structure is not particularly secure, however. The absence of forms like *debatable, *indefensible, etc. would also follow from the observation that truncation applies only to unstressed instances of -ate. Furthermore, this affix appears in two classes of words, associated with either 'level 1' or 'level 2' phonology. The 'level 1' forms undergo truncation of -ate, but the 'level 2' forms do not: see pairs such as demonstrable (level 1) vs. demonstrative (level 2). While the (non-truncating) level 2 formation seems quite productive, the (truncating) level 1 formation is, as we would expect, somewhat less so. As a result, even in cases where we have no reason to doubt the affixal status of -ate, the only possible form in -able may not show truncation. Consider the word truncate itself, from which we find truncatable but not *truncable. The absence of e.g. *translatable might thus just be a lexical gap.

Furthermore, other instances of truncation seem clearly to involve morphological non-constituents. A considerable range of such forms in French is provided by Corbin 1987, p. 345, including:

1. virus – viral; cactus – cactée; rectum – rectal; tétanos – tétanique
3. rigide – rigideur – rigueur; humide – humidifier – humeur
4. certain – certitude; caillou – caillasse
5. charité – charitable; hérédité – héréditaire; vanité – vaniteux
6. adroit – adresse, maladroit – maladresse

In none of these cases have we any reason (apart from truncation) to believe that the truncated material is a morphological unit in French: truncation appears here.

4This distinction is couched here in the terms of Lexical Phonology, but is also familiar as the difference between the phonology of 'boundary' and 'adjacent' affixes, etc. Nothing hinges on the choice of terminology here.
to be applying to phonologically characterized parts of words. In the absence of clear instances of the situation suggested by Aronoff, where only a morphological specification will identify the truncated material, we conclude that rules of truncation do not provide clear evidence for imposing morphological structure on words.

2.4 Phonological Motivation

It seems, therefore, that if arguments are to be found for assigning internal morphological structure to words, they must come from phonology. Indeed, phonologists have generally been the principal consumers for such structure, which appears in their analyses in several forms. Within the "Standard Theory" of generative phonology (as represented by Chomsky and Halle 1968), an inventory of 'boundary' elements of several types appear between morphological elements within a full (syntactically motivated) labeled bracketing giving hierarchical structure. Such a representation allows for simultaneous access to morphological and semantic form, as well as to a quasi-phonological re-encoding of such form (represented by the differing strength of boundary elements), at all points in the morphological and phonological derivation of a word. Within more recent theories of of Lexical Phonology (see the references cited above), the range of available information is greatly reduced. The only non-phonological structure available to the morpheme and the phonological is the bracketing of morphological constituents; furthermore, even these brackets are assumed to be erased at some point in order to constrain later reference to included structure. A variation on this picture (from our point of view) is provided by the representations employed in Autosegmental Morphology (McCarthy 1981 and subsequent work): here distinct tiers of a representation contain the phonological content particular to individual morphological units, and the association of two aspects of phonological form with distinct morphological content is reflected in their presence on distinct tiers. On the other hand, it is also assumed that originally distinct tiers are conflated at some point into a single representation. The motivation for this is to constrain later reference to included structure, in a way entirely analogous to the function of bracket erasure in Lexical Phonology.

It was recognized early that the amount of structure made available in the 'Standard Theory' was excessive, and that the possible relevance of morphological structure was much more limited than implied by that framework. This has resulted in all subsequent views incorporating (a) a much more parsimonious reference to non-phonological structure in the representations accessible to phonological rules; and (b) overt devices (such as 'bracket erasure' or 'tier conflation') to constrain the range within a derivation where particular pieces of such non-phonological information are in fact available to the phono-logy.

As noted above, principles such as the Adjacency Condition and Strict Cyclicity provide narrow limits on the amount of morphological structure that might be relevant. In general, it seems possible to eliminate reference to any structure except the most recent layer: this is what is achieved, for example, by having 'bracket erasure' apply at the end of each cycle in Lexical Phonology. One argument in the literature (in Kiparsky 1982) for a more permissive position, on which bracket erasure applies at the end of a level rather than at the end of each cycle, can be eliminated by restricting the ordering of two rules of English derivation. Since the derivational theory appeals to rule ordering in an event (to get the affixes attached in the right linear sequence), this seems a minimal price to pay. Other arguments to the effect that morphological structure persists beyond the point at which it is created have been adduced by McCarthy 1986, 1989, but these also turn out to be subject to reanalysis (see Bat-EI 1989) in ways consistent with immediate tier conflation/bracket erasure.

Summarizing an extensive earlier literature, there are essentially three ways in which morphological structure might be relevant to the operation of a phonological rule:

1. A rule might be constrained to apply only within a given domain, and not over its boundaries.

2. A rule might be constrained to apply precisely at the (right or left) edge of a morphologically delimited domain (i.e., before or after a boundary).

3. A rule might be constrained to apply to a given string only when it contains a boundary between two domains.

In fact, however, within the general framework of a cyclic morphology and phonology, such as that presumed by Lexical Phonology, accounts exist of all of these kinds of influence that do not invoke morphological structure per se.

If rules apply cyclically, they can only operate on the material contained within the current cycle. Limiting a rule's application to a particular domain can always be achieved by associating it with the cycle introducing some specific new material characterizing that cycle. As a result, it is not necessary to allow explicit reference to boundary elements or hierarchical morphological structure within the structural descriptions of individual rules in order to ensure that their scope of application is limited to a single (cyclic) domain.

Allowing the structural descriptions of (cyclic) rules to include reference to their end points achieves the effect of a rule that applies only before (or only after) a boundary, so long as the rule applies on the appropriate cycle. It is thus necessary to allow rules to refer to the edges of the forms to which they apply, but (in the context of cyclic application) such reference clearly does not entail the existence of boundaries or other representations of structure within the word itself.

There are a number of subcases to the class of rules that only apply across a boundary, but the most important one potentially is the following: some rules apply to a string /...XYZ.../ if and only if the edge of the previous cyclic domain falls somewhere within XYZ. It turns out that in such cases the precise location of the boundary typically does not matter. They thus form a subset of a well studied problem in phonology, that of rules which apply only in 'derived environments'.

We do not pretend to have a complete, general solution to this fundamental problem in phonological theory. We wish only to suggest that the basic content of this notion is one that, on the one hand, can be stated so as not to imply the presence of explicit word internal morphological that persists after the operation of word formation rules, and on the other hand, obviates other sorts of phonological
reference to such structure. Consider the following tentative formulation of a ‘Derived Environment Condition’:

(3) Where \( \mathcal{R} \) is a Derived Environment Rule, if \( \mathcal{R} \) would apply to \( /...XYZ.../ \) on some cycle \( i \), motivated by the application of morphological rule \( \mathcal{M} \), the application of \( \mathcal{R} \) is blocked if \( /...XYZ.../ \) was present at the beginning of cycle \( i \) (prior to the operation of \( \mathcal{M} \)) in exactly the same form.

This condition assumes that not all rules are subject to it. Perhaps general principles exist to predict whether or not a rule is a ‘Derived Environment’ rule; for instance, it might be the case that all and only cyclic rules are subject to (3) or its replacement, as assumed in many versions of Lexical Phonology. On the other hand, some evidence suggests that whether or not a rule is a ‘Derived Environment’ rule is in part an idiosyncratic property, and so we leave this possibility open.

The content of such a condition (similar to what was once known as the Alternation Condition; see Kiparsky 1973) is that a rule can apply on a given cycle in response to something about a form that has changed on that cycle. We seek to need such a condition in any event, to cover cases in which no boundary element appears as such; but a large class of apparent boundary effects can be subsumed under it, removing this additional motivation for imposing morphological structure on words.

3 Conclusion

As will be seen, the thrust of the program assumed here for inter-relating morphology with phonology, syntax and semantics is to replace reference to morphological structure within a form by conditions on the structure of the derivation of a word. It may seem that this is merely a choice between ‘notational variants’, but there is arguably much more to it than that. Conditions on the structure of derivations are inherently local, if we assume the normal markovian notion that only the properties of a form, not its history, can be relevant to rules operating on it. Assigning structure to a form itself, in contrast, allows broader reference to that structure. Insofar as such broader reference is not in fact found, we need an explanation of why that should be the case—an explanation which is provided immediately by the claim that no such structure is ever created.

We have not, obviously, covered all of the possible arguments that might be found in the literature for the assignment of word-internal structure in a manner similar to the representation in (1). Nonetheless, it seems that a representative range of apparent motivations for such structure are either illusory or susceptible of reformulation; in terms that do not require us to assign constituent structure internal to words. The overall message is the following: If we treat the morphology of a word as the way in which it is related to other words through a system of rules, rather than the way it can be assembled out of morphemes into an internally complex structure, we account naturally for the paucity of reference to such structure in the principles of natural language. We can also maintain the minimal (and hence ideal) theory that what we see when we look into the structure of a word is what we get: an association of sound with meaning (and syntax). Punkt. There is no question of where brackets or boundaries are erased, or tiers conflated, because there are no brackets or boundaries to be erased (or tiers to be conflated).

If we could motivate the existence of word internal morphological structure, this would be a significant point about the nature of language, since such structure (as opposed to the phonological and semantic content of words) is not at all patent. Rather, it is only inferred from the relation of words to one another; and what we have seen is that once we have described the relations themselves (which must be done in any event), the additional step of attributing additional internal form to the items that are related is probably unnecessary. It is always a matter of considerable intellectual interest and satisfaction to be able to show that the structure of some aspect of reality is actually very abstract, and only indirectly related to its appearance through a chain of inferences. It can be a matter of even greater satisfaction, however, to show that in fact the world is just as it appears to be, and nothing more.

References


