

1: Ground

We will be concerned in this work with the internal structure of words, a subject which, in the linguistic literature, is called *morphology*.

The notion *word* has long concerned students of language. Its definition is a long-standing problem in linguistics, and entire volumes have been devoted to the subject (e.g. Worth (1972)). A reasonably detailed procedure for isolating phonological words (units which may be considered as words for phonological purposes) is provided in Chomsky and Halle (1968, 366–370; henceforth SPE). Further refinements of this approach are discussed in Selkirk (1972). Syntactically, Postal (1969) puts forth a persuasive argument that the word, as a syntactic unit, corresponds to the *anaphoric island*, which is a syntactic string the internal elements of which cannot participate in anaphora. Though semantic definition of the notion is a traditional goal, it has not, to my knowledge, been achieved.

To say that morphology is word structure is not to say that all of the structure of the word is encompassed in the domain of morphology. There is a branch of phonology, termed *phonotactics* or *morpheme structure*, which concerns itself with the determination of possible sequences of sounds in a given language, “possible phonetic words”. This is not morphology. Morphology treats words as *signs*: that is, not just as forms, but as meaningful forms. It is therefore concerned with words which are not simple signs, but which are made up of more elementary ones. This concern encompasses two distinct but related matters: first, the analysis of existing composite words, and second, the formation of new composite words. A unified theory of morphology should be capable of dealing with both of these areas in a unified and coherent manner, though it may not be possible or even desirable, as we will argue below, to treat them in exactly the same manner.

On the subject of unified theories, it should be stressed that morphology, as defined, is a small subsystem of the entire system of a language. A theory of morphology must be integrated or at least integrable into a fairly specific general theory of language. As a subsystem and a subtheory, morphology may have its own peculiarities; a system can be unified without being completely uniform. However, it does not exist in a vacuum. The present work is conceived in the general framework of transformational grammar as outlined in such works as Chomsky (1965) and SPE. More particularly, it presupposes the lexicalist hypothesis of Chomsky (1970) and at least the spirit, if not the letter, of Kiparsky’s views with regard to phonological abstractness, discussed in Kiparsky (1973).

1.1. Derivation and Inflection

There are traditionally two types of morphological phenomena, *derivational* and *inflectional*. The distinction is delicate, and sometimes elusive, but nonetheless important. Inflection is generally viewed as encompassing the “purely grammatical” markers, those for tense, aspect, person, number, gender, case, etc. Within a lexicalist theory of syntax (cf. Chomsky (1970)), inflectional morphemes would be dominated by the node X, and perhaps higher nodes (cf. Siegel (1974)), while derivational morphemes would be dominated by the node X. Derivational morphology is thus restricted to the domain of *lexical category*.

It is generally true, and in accord with the lexicalist formalism, that derivational markers will be encompassed within inflectional markers. In the English word *compart+ment+al#ize#d*, for example, the last morpheme, *#d*, is inflectional, and all those internal to it are derivational. The two sets may not be interspersed. Thus the word *compart+ment+al#iz+ation#s* is possible, though the word **compart+ment+al#ize#d+ation#s* is not.

One peculiarity of inflection is that it is *paradigmatic*. Thus, every English nonmodal verb exhibits a paradigm consisting of the following forms:

V	V#s	V#d ₁	V#d ₂	V#ing
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For example:

sigh	sighs	sighed	(has) sighed	sighing
go	goes	went	(has) gone	going

The verb *go* exhibits *suppletion*, the filling of one of the slots of the paradigm by a phonologically unrelated form. Since derivational morphology is not paradigmatic, it does not show any suppletion: that is, it does not concern itself with phonologically dissimilar but semantically related forms.

Sometimes a paradigm is *defective*, lacking a form. The missing form is almost always the uninflected one. So, in English, we have *scissors*, *pants*, and *trousers*, but not **scissor*, **pant*, or **trouser*, except, of course, in derived forms, where (as the following examples demonstrate) the constraint on the mixing of morphologies still holds:

scissorlike	*scissorslike
trouserleg	*trousersleg ¹

A fuller description of some of the properties of inflectional morphology can be found in Bloomfield (1933). An independent characterization of the properties of derivational morphology is more difficult. Nida (1949) suggests the following: if, in a syntactic class (defined by substitution in his system, and in corresponding ways in other theories), we find items which are monomorphemic, then the polymorphemic items in that class are derived by the system of derivational morphology. The most immediate problem for such a definition is the existence of suppletive forms, such as *went* above, which, by Nida’s criterion, would force us to include the past tense suffix in derivational rather than inflectional morphology. This is where the paradigm enters. We find that the past tense is a paradigmatic category, and therefore must be

¹ The behavior of *pants* is exceptional:

pantspocket	*pantpocket
pantsleg	*pantleg

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inflectional. We might also invoke more abstract syntactic evidence to show that though *went* is monomorphemic on the surface, there is evidence for an abstract past tense morpheme. This is more difficult, though perhaps possible. In any case, as he himself notes, Nida's simple criterion must be amended to exclude clearly suppletive forms which are members of paradigms.²

1.2. Other Types of Morphology

Derivation and inflection do not exhaust the domain of morphology. There are "grammatical" morphological phenomena which cannot be subsumed under inflection. The best known of these is that of incorporation or cliticization. In Classical Hebrew, for example, under specific conditions (basically, when they are anaphoric rather than deictic) definite pronominal objects are incorporated into the verb, forming a single phonological unit with it. There is no question here of inflection, since this specific form of the verb only occurs when we would otherwise expect a definite pronoun object. A similar situation holds in English (cf. Selkirk (1972)).

A slightly more complicated example along the same lines comes from Syriac. Here, in addition to pronoun object cliticization, we have the copying of a pronoun for any definite object, other than anaphoric pronouns. The copied pronoun is cliticized to the verb, giving the same verb form as that containing the pronoun object. Clearly, the copying and the cliticization are both syntactic facts, and they are not paradigmatic.

Sometimes other material than pronouns can be incorporated into the verb. In Navaho, a specific adverb may sometimes occur inside the verb, and sometimes elsewhere in the sentence, but never in both places in the same sentence. This fact can be most easily captured by a syntactic movement rule.

²More difficult for Nida are cases of syntactically or semantically arbitrary forms. Consider, for example, the noun *police* in the following example:

- (i) The police have arrested six people already.

The verb shows us that the noun is syntactically plural. Unlike a word like *sheep*, which is ambiguous between singular and plural, *police*, in this sense at least, never appears in a singular context. Here, we cannot argue in any straightforward way for the existence of a zero plural marker, as in *sheep*. Nor can a paradigm help, since there is none. In fact, a noun like *police* is disturbingly similar to the sort of item which Nida would invoke to show that one is dealing with a derivational system. Consider the set of agentive occupational nouns shown below.

	a.	b.	c.
(ii)	baker	cook	chef
	packer	pilot	chauffeur
	painter	coach	smith
	hunter		mechanic
	tanner		surgeon

The items in column (a) exhibit a suffix: *-er*; those in (b) might be derived by zero derivation from the corresponding verb. The items in (c), however, have no corresponding verb from which they may be derived. This is exactly the type of example Nida uses to show that a class like that of agentive occupational nouns is not inflectional. But is not *police* like the items in (c)? Ideally, we would like to have a syntactic theory which allows a zero morpheme in *police* (plural) but not in *chef*. We do not yet have such a theory. In any case, Nida's simple criterion is not sufficient to capture our intuitive notion of what exactly is meant by *derivational category*.

There is no traditional term for this third type of morphology. It is clearly “syntactic”, and on that ground it can be grouped together with inflection, as opposed to derivation. There is often a clear historical connection between pronoun copying and cliticization and verbal agreement, and it may very well be that all agreement arises by a falling away from and generalization of pronoun cliticization. This would of course strengthen the contention that this third type of morphological phenomenon and inflection are really of the same nature, and opposed to derivation.

I will accept this opposition in the greater part of the body of this work and restrict the scope of further discussion to the domain of derivational morphology. This restriction will be relaxed only in regard to the interaction of phonology and morphology, where morphology encompasses both inflectional and derivational markers.

1.3. A Brief Survey of the Recent History of the Study of Morphology

Morphology is not something new or, like syntax, something much talked about for many years but little studied or understood. The early Indo-Europeanists, Bopp for instance, were interested almost solely in morphology, and morphology has remained one of the mainstays of the philological tradition (cf. the extensive bibliography in Marchand (1969)). Though their tools were better adapted to phonological and morphophonemic purposes, American descriptivists did do much substantive work in the area of morphology as we have defined it.

In the specific area of English morphology, I have already cited Marchand (1969) and my debt to it. Jespersen also devoted a volume of his *Modern English Grammar* to the subject. Among more recent works, I will note Zimmer’s monograph on affixal negation (1964), which is notable for its concern with semantics and the very general and difficult problem of productivity.

Within the generative framework, morphology was for a long time quite successfully ignored. There was a good ideological reason for this: in its zeal, post-*Syntactic Structures* linguistics saw phonology and syntax everywhere, with the result that morphology was lost somewhere in between. For proponents of early generative grammar, grammar consisted of syntax and phonology. Phonology, at last freed from its phonemic blinkers, encompassed all of morphophonemics and phonemics in a grand system of ordered rules. Syntax took care of everything else: “all of the grammatical sequences of morphemes of a language” (Chomsky (1957, 32)). Within such a framework, morphology is not a separate study. In fact, though some of the earliest studies in transformational syntax were specifically restricted to the domain of the word (e.g. Lees (1960)), this domain was not considered to differ in any real way from that of the sentence. Even very recently, the school of generative semantics has insisted that the word is fundamentally no different from any other syntactic unit, thus espousing a position like that of early generative grammar, which in essence denies the independence of morphology.

Recently, a substantial interest has arisen in the peculiarities of inflection as a separable syntactic phenomenon. The first study in this area was that of Bierwisch (1967). It has been

followed by others, of which I will note Wurzel (1970) and Kiefer (1970, 1973). I will not discuss these works here, as their research lies outside the domain established for this monograph.

1.4. The Return of Morphology

Morphology found its way back into generative linguistics through several rear doors, almost simultaneously. The first hints that there might be something between syntax and phonology are found in SPE. There the question is first raised of whether the output of the syntactic component is in fact the input to the phonological component. It is noted that there are “certain discrepancies”, and that “. . . the grammar must contain certain rules converting the surface structures generated by the syntactic component into a form appropriate for use by the phonological component.” The rules referred to in this passage divide surface structure into phonological phrases. They are called *readjustment rules* and are supposed generally to “involve elimination of structure”. An illuminating discussion of such rules is contained in Selkirk (1972). But these are not the only rules called readjustment rules. There are in addition rules which “eliminate grammatical formatives in favor of phonological matrices”, for example converting $[[\text{sing}]_{\text{V past}}]_{\text{V}}$ into *sung* and $[[\text{mend}]_{\text{V past}}]_{\text{V}}$ into *mended*. The term *readjustment rule* is obviously being used broadly, for these last rules are clearly rules of inflectional morphology. Yet a third type of readjustment rule is in no way connected with elimination of structure. This sort applies (SPE, 223)

. . . to specific derivable formatives; for example the rule (110):

$$(110) \quad t \rightarrow d/ = \left\{ \begin{array}{l} \text{mi} \text{ ——— } + \text{ive} \\ \text{ver} \text{ ——— } + \text{ion} \end{array} \right\}$$

Rule (110) is a very different sort of morphological rule. It is a rule of allomorphy, which spells out the form of particular morphemes in specific morphological environments.

We see, then, in SPE, the beginnings of a recognition of the independence of certain classes of phenomena from syntax and phonology. The term *readjustment rule* is not a particularly well-defined one, but among the rules so termed we do find a significant number which are plainly morphological.

SPE inadvertently created in its wake a second entrance for morphology. The purely formal spirit of Chomsky’s and Halle’s approach to phonology in general, and of the sketch of English phonology presented in SPE in particular, prompted a reaction. It was felt by many scholars, most prominently Kiparsky, that by disregarding concrete evaluation measures Chomsky and Halle were often led to propose phonological systems which were too abstract and to abuse the classificatory function of the phonetic features. Historically, these criticisms can be seen as a reaction to the excesses of revolutionary fervor. Remember that Chomsky and Halle were fighting against a theory which termed phonological only the most apparent of alternations and which put all others into one morphophonemic bag of lists, without regard for the differences in regularity among them. The revolutionary step of these pioneers was to pull down the phonemic barrier and declare all alternations to be the province of phonology. But,

said their critics, surely not all connections are phonologically regular? Most of those which were earlier included under the morphophonemic label can indeed be treated as phonologically governed rules, but there is some limit. There are alternations which are just not determined by purely phonological features.

A further step, one which the critics have by and large not taken, is to ask whether some of these alternations which are not phonologically determined are in fact not part of the phonology at all. I will argue below that a class of rules which a more tightly constrained theory rejects as not optimal phonological rules can be fruitfully included in a theory of morphology.

Thus, because of a desire to place restrictions on the power of phonological theory, we find that certain phenomena now lie outside the domain of the theory. Many of these phenomena can be seen as morphological. We find the same kind of pattern that came to light in SPE.

A similar retreat took place at about the same time in syntax. In an attempt to restrict the power of grammatical theory, certain phenomena were removed from the domain of the syntax. In contrast with phonology, however, where the realization that the system as it stood could not be sufficiently constrained came gradually and inexorably, with very little objection on anyone's part to at least the spirit of the trend and with curiously few suggestions as to the nature of the discarded material or what should be done with it, morphology sprang out of syntax's thigh full-blown and caused a great to-do when it did so. The birth of morphology, or at least the declaration of its domain, is simultaneous with, and contained in, Chomsky's "Remarks on Nominalization" (1970). This paper presents a new theory of syntax, in which all of derivational morphology is isolated and removed from the syntax; it is instead dealt with in an expanded lexicon, by a separate component of the grammar. This distinction legitimizes the field of morphology as an independent entity.

"Remarks on Nominalization" was long and bitterly opposed, mainly, I believe, on esthetic grounds. Where previous and rival theories view language as one vast domain, encompassed by pervasive constraints (cf. Postal (1972)), Chomsky prefers to see language as divided into smaller well-distinguished units, each governed by its own, perhaps idiosyncratic, rules. As the reader will discover, I am more inclined toward the latter perspective, even within the narrow field of morphology.

Chomsky did not propose a theory of morphology; he merely suggested that there should be one, and that its properties, if he is correct in dividing morphology from syntax so sharply, should be very different from those of an adequate theory of syntax. I will attempt to elaborate such a theory. The theory which I will present bears, indeed, little resemblance to any prevalent theory of syntax. It will also encompass many phonological phenomena which cannot be easily incorporated into a reasonably narrow theory of phonology, and it will provide what I think is a unified account of morphological phenomena within a generative grammar. This unity is important. Critics of the new esthetic accuse its proponents of excessive rug-sweeping, clearing away so much data in the name of restricting the power of a grammar that the describable residue becomes miniscule. However, if we can show that what has been swept aside can be gathered up again, then we are vindicated in our vision.

2: Teleology

The purpose of this chapter is to explore further the general relationship between morphemes and words. In what sense do words consist of morphemes? Is there some constant relation between the two, as in syntax, where practically all sentences can be said to be synthetic entities, constructed out of words in a single way? We will see that words are very different from sentences, that their structures are much more varied, and that though there is a single principle governing the structure of most complex words, this principle must be applied in different ways to different classes of words. I will discuss these various classes.

Before going on to words, however, I must say a few things about morphemes, for though these units are basic to several aspects of the theory of language, their properties have been more asserted than studied, and since they are so central to our investigation we must be particularly careful that we know whereof we speak.

2.1. Trouble with Morphemes

The units into which words are analyzed, out of which they are composed, are termed *morphemes*. We will be concerned in this section with some problems concerning the defining characteristics of the morpheme, concentrating on a central premise of the approach which has been most pervasive in American linguistics. This premise is the definition of the morpheme as “the smallest individually meaningful element in the utterances of a language” (Hockett (1958, 123)). Accepting this premise entails that every polymorphemic word is a compositional entity. It is compositional in two senses, both semantically and structurally, the semantics being a function of the morphemes and the structure, just as a sentence is semantically compositional. Recent work has revived the truism that every word has its own idiosyncratic traits, some of which can be very erratic and elusive. (We are speaking here of derivational words; this waywardness does not extend to inflection.) If it is true of words that they are minimally meaningful, then what about the morpheme? Does it have no status at all, or can we define it other than semantically? The point of this section is to show that the latter question can be answered in the affirmative. Specifically, we will isolate a class of morphemes, show that there is no way in which the members of this class can be said to have any meaning at all, and then demonstrate that there are phonological criteria which allow us to isolate occurrences of these meaningless morphemes. The importance of this demonstration is two-fold. First, it shows us that any theory of “minimally meaningful element” is misguided. Second, it shows that despite this fact, it is still possible to construct a theory in which the morpheme plays a central role.