STUDIES IN DERIVATIONAL MORPHOLOGY

by

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ABSTRACT

This thesis develops a theory of derivational morphology incorporating a lexical structured by rules. A notation is introduced which relates lexical deep-structure to surface-structure, and the notion of derivational function is introduced. Various derivational functions of English are examined, in particular the derived nominal. Arguments are presented favoring the structured lexicon over the unstructured lexicon and opposing the lexical analysis of generative semantics. Finally, some problems raised within the structured lexicon are discussed, including accretion and the classification of adjectives. Major primitive lexical categories are isolated—noun, adjective, and verb—and each of these is shown to be morphologically related to the others.

Thesis Supervisor: Paul Kiparsky
Title: Professor of Linguistics
For my grandmothers, who wanted to see it finished.

And as no man knows the ubicity of his tumulus nor to what process we shall thereby be ushered nor whether to Tophet or to Edenville in the like way is all hidden when we would backward see from what region of remoteness the whatness of our whoness hath fetched his whenceness.

--James Joyce

_Ulysses_ [394]
ACKNOWLEDGEMENT

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1.1 THE RELATEDNESS OF WORDS

Like other components of generative grammar, morphology seeks to relate sound and meaning. Generative syntax grew out of the discovery that certain surface sentence types could be systematically derived from deep structures by rule. Generative phonology evolved from a similar discovery about sound segments. Generative morphology, in turn, is based upon the hypothesis that certain patterns at the word level are basically systematic, that words can be related by rule, that there is such a theoretical level as lexical deep structure. Morphology establishes sound and meaning correspondences within the lexicon, and thus it involves phonology and semantics—and syntax in that each derivative must be assigned a syntactic category.

1.1.1. EXAMPLE

Let us begin with an example. We observe that in English, country names and adjectives of nationality (often also language names when used as nouns) are morphologically paired:

(1) England/English, France/French, Wales/Welsh, Ireland/Irish, Tibet/Tibetan, Germany/German, Sweden/Swedish, Norway/Norwegian, Denmark/Danish, Vietnam/Vietnamese, Russia/Russian, China/Chinese, Finland/Finnish, Hungary/Hungarian, Italy/Italian, Peru/Peruvian, Spain/Spanish, Portugal/Portuguese, Iceland/Icelandic, Afghanistan/Afghan, Belgium/Belgian, Holland/Dutch, Israel/Israeli, Switzerland/Swiss.

Each of these pairs differs phonologically from each of the others.

(Although some common endings occur, such as -ese, -an, -ish, the roots vary
widely). The syntax and semantics of these pairs are similar, however. In the lexicon we may represent the meaning relationship of the noun and adjective in parallel ways. Once we have appropriately defined the noun, we may list the adjective as meaning PERTAINING TO N, where N is the country in question.

The ending -ish may be taken as standing for the lexical function that maps each of the proper nouns of (1) onto an adjective. We term this correspondence "functional" because it is a one-to-one pairing of forms. Picking -ish (somewhat arbitrarily) as the underlying suffix, we can abstractly represent all the adjectives as N-ish in deep structure. Once this ending is defined derivationally for the adjective English, coming from England, it will be economical to define all the other national adjectives, whatever their shape. Even Holland/Dutch is semantically regular, the adjective being represented in deep structure as (Holland N-ish)

The derived adjectives of (1) may themselves be mapped onto nouns like Englishman. The function which performs this mapping may be named -man and assigned the meaning ETHNIC REPRESENTATIVE:

(2) English/Englishman, French/Frenchman, Welsh/Welshman, Irish/Irishman, Tibetan/Tibetan, German/German, Swedish/Swede, Norwegian/Norwegian, Danish/Dane, Vietnamese/Vietnamese, Russian/Russian, Chinese/Chinese, Finnish/Finn, Hungarian/Hungarian, Italian/Italian, Peruvian/Peruvian, Spanish/Spaniard, Portuguese/Portuguese, Icelandic/Icelander, Afghan/Afghan, Belgian/Belgian, Dutch/Dutchman, Israeli/Israeli, Arabic/Arab, Jewish/Jew, Swiss/Swiss.

This time some regularities in the phonology can be observed, such as the fact that adjectives ending in -ese and -an remain unchanged in the noun.
Naming the function that performs this mapping as -man, we observe that the semantics is again regular, so that Spaniard may be represented in deep structure as [[Spain_N]-ish_A]-man_N. In general it is simpler to derive the -man nouns from the adjectives, rather than relating them directly to the country names, but note that Finn, Dane, Swede, Arab, and Jew appear to constitute a subclass where the "derivative" is shorter than the "source". Such problems frequently arise in the data presented in this work.

Related to the noun-forming function is the interesting elliptical operation evident in sentence (3):

(3) The English drink tea, while the French and the Portuguese prefer wine.

Here the noun people seems to have been deleted, but the operation must be lexical rather than syntactic, since it is morphologically constrained: no -an adjectives may occur in this construction:

(4) *The Russian drink tea.

(5) *The Italian eat spaghetti.

Connected with country names there is yet another function, evident in the verbs Germanize and Americanize. It is regularly -ize for all the national adjectives ending in -an, but it is Frenchify for French, Russify for Russian, Anglicize for English, Vietnamize for Vietnam (here the root seems to be the noun rather than the adjective), while for the rest no verbs exist: *Portuguize, *Chinify. This lack of forms is not unusual in morphology. Some states and cities have derived names for RESIDENTS, while for many these are morphologically undefined:

Cantabrigian, Kentucky/Kentuckian, Massachusetts/*, Minneapolis/*, Connecticut/*, New Haven/*, Amherst/*, Texas/Texan, Oregon/Oregonian, Maine/Mainer, Indiana/Hoosier, Cincinnati/Cincinnatian, Arkansas/Arkansawyer, Virginia/Virginian, Terre Haute/*, Los Angeles/Angeleno.

1.2 REASONS FOR PAIRING

As we are beginning to discover, morphology depends upon shared intuitions of likeness and difference, judgments of phonological and semantic "closeness" and "distance". This work seeks to explicate the nature of these notions, to explore criteria for pairing.

The words sane and sanity are paired by the morphology in much the same way that Italy and Italian are paired, for example. There are essentially two reasons for this decision. First, there is the phonological fact that these formatives share distinctive features; they have in common the struction /sVn/ and can be related by straightforward phonological rules. Second, there is the semantic fact that these words participate in analogies. There exists in English at least one semantically parallel match (e.g., pure/purity) which may occur in similar sentence slots:

(7a) Martha asked if Alice was sane.
(7b) Martha asked if Alice was pure.
(8a) Martha asked about Alice's sanity.
(8b) Martha asked about Alice's purity.

By relating these pairs, morphology expresses the fact that part of the competence of English speakers is the ability to construct such analogical patterns. Speakers know that sane and sanity are related, much as they know that the finite verb is second in the syntax of WH-questions.
1.2.1 PSEUDO-PAIRS

This point becomes clearer if we consider some pairs that we do not choose to relate morphologically. These are pairs which fail the phonological and semantic criteria.

For example, we note that the deletion of initial /l/ frequently produces a new English word:

(9) ledge/edge, loan/own, learn/earn, lend/end, legal/eagle, lax/ax, leer/ear, lame/aim, lake/ache, lore/ore (oar), lyre/ire, lair/air, limp/imp, lamp/amp, lace/ace, love/of, load/ode, late/eight, loaf/oaf, label/able.

Some of these pairs seem at first semantically close (e.g., ledge/eage, loan/own and lamp/amp), but observe that no two such pairs can be united in an analogy. Each semantic relationship is different.

We are able to rule these out as morphological pairs because they fail the second (semantic) criterion. The deletion of /l/ has no morphological function. The similarity in sound of these formatives is a linguistic accident; the pairs have no place in our morphology. Lack of analogy rules out hear/ear and truck/track in a similar way.

A false pair of another kind fails the phonological criterion. A sort of analogical relationship does exist in the case of table/chair and bar/stool:

(10a) John is sitting at the table.

(10b) John is sitting at the bar.

(11a) John is sitting on a chair.

(11b) John is sitting on a stool.

However close the semantics, no natural phonological rule readily relates these pairs. Here the semantic closeness is a fact about the real world,
not a fact of grammar. The ability to construct analogies of this kind is not linguistic.¹

1.2.2 DEGREES OF RELATEDNESS

The phonological and semantic conditions on morphological pairs may be fulfilled to varying degrees. There may be exact sound correspondence with the affixation of a fixed element and no other operation, as in red/redness, where the only phonological change is the addition of the suffix -ness in the noun. Or there may be very little sound correspondence, as in swan/cygnet, where /s/ and /n/ are the only shared segments and where the required affix is a reduced form of -let, the diminutive suffix of drop/droplet and eye/eyelet (although eyelet is not semantically diminutive). The pair swan/cygnet is semantically supported by analogy with pig/piglet, so the pair has some morphological plausibility, despite the low productivity of its phonological pattern.

On the semantic side there may be very many available analogies, as in the highly productive noun-forming suffix -ness. Or there may be only a small number of analogical pairs, as in the adjectives hourly, daily, nightly, weekly, monthly, quarterly, yearly (British fortnightly)² from the nouns hour, day, night, week, month, quarter, year, (fortnight). No other time expressions follow this pattern: *minutely (with lax vowels), *secondly, *noonly, *midnightly, *decadely, *centuryly.

We will find morphological pairs that show semantic analogy, but are phonologically unique. Examples are clean/cleanliness with analogy mean/meanness, enormous/enormity with analogy monstrous/monstrosity, and grateful/gratitude with analogy decrepit/decrepitude. Here various phonological elements appear or disappear idiosyncratically. Some pairs are unique, but
supported by the existence of others, as in the derivatic of \textit{fortunate} from \textit{fortune} paralleled by \textit{lucky} from \textit{luck}.

Similarly, we encounter pairs that are phonologically analogical, but semantically unique. For example, we find that \textit{steal/stealth} and \textit{heal/health} follow similar sound patterns, although the semantic analogy is quite weak:

(12a) Alice steals into the night.

(12b) Alice heals quickly.

(13a) Alice's stealth pleases the witches.

(13b) Alice's health pleases the witches.

It is crucial to note that as language changes, certain historically motivated morphological pairs become unavailable to modern speakers. The derivational connections have been lost, for example, in \textit{thrive/thrift}, where the noun is no longer semantically close to the verb. One may exercise \textit{thrift} without \textit{thriving}. Here the phonological pairs that exist (\textit{give/gift} and \textit{thieve/theft}) do not support the pairing semantically.

Some other historical formative pairs that are probably unavailable to modern speakers of English are: \textit{fiscal/confiscate}, \textit{temple/contemplate}, \textit{fable/fabulous}, \textit{grieve/grave}, \textit{require/requisition}, \textit{appoint/disappoint}.

Words may be connected historically, but not morphologically: \textit{vine}, \textit{wine}, \textit{vintage}, \textit{vintner}, \textit{vinyard}, \textit{vinegar}. \textit{Vinyard} is related historically to \textit{orchard} and \textit{garden}, but speakers cannot be counted on to know this.

1.3 DERIVATION AND INFLECTION IN THE LEXICON

We have seen that morphology is based upon the notion morphological pair, which in turn is grounded in phonology and semantics. So far we have not distinguished between derivational and inflectional morphology. The distinction becomes important when we turn to the structure of the lexicon.
The lexicon, or dictionary, contains an exhaustive listing of formatives. There lexical items are recorded, assigned a syntactic class, a semantic representation, and a phonological shape. Some items will have alternative shapes; for example, the verb sing has variant verbal forms sings, singing, sang, and sung. Some items will be related to other items, and such relations will also be noted; for example, the verb sing is related to the noun song.

Derivational morphology maps lexical items onto other lexical items, while inflectional morphology deals with lexical structure within items. Derivational morphology effects mappings external to the lexical item, while inflectional morphology brings about internal mappings.

This work will be primarily concerned with external mappings, or derivations, but as we will note, the two types of morphological relationship are not always mutually exclusive. In particular, there are cases where derivational forms appear to have inflectional status, and contrary cases where inflectional forms acquire derivational character.

1.3.1 THE TAXONOMY OF DERIVED NOMINALS

Before turning to some examples of this inflectional/derivational cross, it is necessary to define a syntactic class which is repeatedly referred to in the work which follows, the derived nominal. In our terminology, derived nominals are a special subset of the set of derived nouns. In particular, derived nominals are defined as those deverbal and de-adjectival noun derivatives which have S-interpretation. [This concept is developed more fully in Chapter Two.]
1.3.1.1 DEVERBAL NOMINALS

It is best to give some examples of nominals and their interpretation. Dismissal is the derived nominal of the verb dismiss. In the sentence

(14) John's dismissal of the alternative explanations was reported to Alice.

we find that the nominal can be interpreted as the verb in an embedded sentence:

(15) That John dismissed alternative explanations was reported to Alice.

Similarly, dismissal is interpreted passively in

(16) John's dismissal (from work) was reported to Alice.

where the sentence means:

(17) That John was dismissed (from work) was reported to Alice.

Like dismissal in either (14) or (16) are the following deverbal nouns ending in -al:

(18) renewal, withdrawal, betrayal, approval, removal, survival, revival, arrival, upheaval, acquittal, rental, recital, espousal, denial, appraisal, trial, referral, portrayal

The list of such nouns is finite, in fact, small. The nominal, however, is not restricted to forms ending in -al. There are several other possible endings, and some of these are "productive". A complete taxonomy includes the following:

(19) -tion: colonization, introduction, devastation, invasion
(20) -ance: disappearance, observance, issuance, acceptance, entrance, utterance, tolerance (=toleration), admittance
(21) -ing: closing, opening, repairing, filing, obeying
(22) -ment: development, deployment, involvement, announcement
(23) zero: display, relay, delay, decay

(24) irregular: conquer/conquest, criticize/criticism, discover/discovery, fail/failure, crown/coronation, store/storage, depart/departure, compare/comparison, conspire/conspiracy, pursue/pursuit

Adhere has two nominals, adherence and adhesion, one abstract and the other concrete in meaning. Example sentences containing these deverbal nominals are:

(25) The troops' invasion of Cambodia angered Martha.
(26) John's closing of the store angered Martha.
(27) Bill's announcement of his divorce angered Martha.
(28) Arthur's delay in replying angered Martha.
(29) The troops' conquest of the capital angered Martha.

In each of the sentences (25)-(29) the nominal may be interpreted as the verb in an embedded sentence.

1.3.1.2 DE-ADJECTIVAL NOMINALS

A de-adjectival nominal example is

(30) John's kindness surprised Martha.

where the sentence means:

(31) That John is kind surprised Martha.

Nominals in -ness from adjectives are quite common:

(32) -ness: hardness, redness, deadness, happiness, readiness

Other endings for de-adjectival nominals are the following:

(33) -ance: dominance, senescence, relevance, reticence, magnificence, reluctance
(34) -ancy: consistency, decency, flagrancy, vibrancy, complacency
     -ency
(35) -cy: bankruptcy, obstinacy, idiocy
(36) -ry: ribaldry, sophistry, bravery, savagery
(37) -ity: responsibility, sagacity, fidelity, felicity, duplicity
(38) -th: strength, wealth, length, width
(39) -itude: decrepitude, rectitude, certitude, fortitude, plentitude

Not all of these nominals have simple adjective sources; for example, felicity has no underlying adjective *felis, although it clearly functions syntactically as a nominal:

(40) John's felicity surprised Martha.

Example sentences containing these de-adjectival nominals are:

(41) John's dominance surprised Martha.
(42) Bill's consistency surprised Martha.
(43) Arthur's bankruptcy surprised Martha.
(44) Peter's ribaldry surprised Martha.
(45) Frederick's sagacity surprised Martha.
(46) Alice's fortitude surprised Martha.

In each of these cases, the de-adjectival nominal is interpreted according to the pattern established in (30)-(31).

1.3.2. INFLECTIONAL/DERIVATIONAL CROSS

The preceding two sections make the claim, which will be repeated throughout this work, that various derivational processes work across the morphology to one purpose. There are a variety of endings involved in its definition, but the notion derived nominal is defined for many verbs and adjectives. Not for all. There is no noun *vanishment, although the pattern
banish/banishment exists, and although the synonym of vanish, the verb disappear, exhibits the nominal disappearance. Similarly, subdue lacks a derived nominal: *subdual, *subduement, *subdusion.

Returning to the claim presented in Section 1.3, we find that although the class nominal is derivational in origin, it shows systematic syntactic and semantic behavior—behavior that seems inflectional in character, except for the fact that the morphology is so diverse. We observed earlier that in the contrary case inflectional endings may yield forms that are essentially derivational in nature. This is true for adjectives in -ed.

1.3.2.1 ADJECTIVES IN -ED

In traditional inflectional terms, -ed is the participial ending for many verbs:

(47) Jo'in helps Bill.

(48) John has helped Bill.

The suffix, however, is found in many adjectival forms which do not seem so closely connected with underlying verbs. For example, the forms

(49) abandoned, refined, deformed, offended, disappointed, wrinkled, stunted, haunted, contented, limited, frosted, bloated, depressed, inspired, dignified, advanced, congested, qualified, amused

may occur prenominally and may take very or quite as adverbial modifier, although the strictly verbal participles may not:

(50) *a very washed dress, *a very watched program, *a quite helped person, *a quite painted room, *a very loved dog

Many adjectives in -ed do not appear to be derived at all:

(51) crooked, wicked, rugged, sacred, demented, wretched
A secluded wood is not a wood that someone has secluded, nor is a devoted servant a servant that someone has devoted. Finally, some -ed derivatives appear to be from noun, rather than verb, sources:

(52) flowered, pointed, talented, conceited, cultured, feathered, prejudiced, detailed, experienced, honeycombed, flatfooted, broad-shouldered

All of these examples combine to suggest that the suffix -ed, although inflectional and verbal, also yields on many occasions adjectives, some of which have been relexicalized (entered in the lexicon as essentially underived primitives).

The nominal and -ed examples show that at least for English a rigorous separation between inflection and derivation cannot be sustained.

Having made these observations, we now turn to the body of the work.
2.1 BASIC CONCEPTS

The structured lexicon consists of two types of elements: items and rules.

The items constitute an exhaustive listing of all the formatives found in the language. They catalog the speaker's knowledge of what is and what is not a word. For any real speaker, of course, the lexicon will change with time as certain items gradually fall into disuse and other new items are adopted, but at any given moment the lexicon is fixed—the set of existent formatives, their possible shapes, uses, and meanings, being strictly delimited.

The rules express generalizations relating the items to one another. Some of these are redundancy rules specifying the nature of a theoretically possible formative in the language. Others capture what the speaker must know about existing formatives, in particular what the speaker knows about word-building processes. These rules presumably help the speaker remember the items in the file and acquire new items for storage. The rules simplify and order the rather idiosyncratic information found at this level.

2.1.1 LEXICAL ITEMS

We will assure that items are entered in the lexicon in a format that specifies phonological properties, syntactic properties, and semantic properties. Every lexical entry will be of the form:

(1) [phonological representation/syntactic representation/SEMANTIC REPRESENTATION]

A sample lexical entry might be:
This entry claims that a lexical item phonologically represented as /lAv/ is a transitive verb requiring animate subject, and that it is interpreted as LOVE. This entry permits use of the item in (3)-(5), but not in (6):

(3) John loves Bill.
(4) John loves his dog.
(5) John loves democracy.
(6) *Democracy loves cashews.

Another lexical item will be represented as:

(7) [ /lAv/ 
+V 
+NP1 __ NP2 \ where NP1 must be [+Animate] 
NP1 LOVE NP2 
]

This entry asserts that there is another item phonologically represented as /lAv/, that this item is an abstract noun, and that it can occur in phrases of types (8)-(10), but not (11):

(8) John's love for Bill
(9) John's love for his dog
(10) John's love of democracy
(11) *Democracy's love of cashews

We have again used the representation LOVE as the meaning, suggesting that item (7) is somehow semantically related to item (2). Unfortunately, it is not yet clear how to represent the semantics more satisfactorily.
Another lexical item for the English lexicon will be:

(12) $\begin{align*}
&/l\text{Av}/ \\
&\text{+N} \\
&\text{SCORE OF ZERO IN TENNIS AND PINGPONG}
\end{align*}$

This entry states that the language contains another formative represented phonologically as $/l\text{Av}/$, that this is a noun used in scoring tennis and ping-pong.

As we have said, the rules of the lexicon capture regularities manifest in the items. Intuition suggests that a rule might interrelate the first two $/l\text{Av}/$ items, but that no rule relates either to the third.

If there is a rule, it must apply to more than one case, of course. Evidence for a rule must be sought in the body of the vocabulary. Supporting a rule relating the first two $/l\text{Av}/$ entries, we find the following items:

(13) $\begin{align*}
&/\text{heyt}/ \\
&\text{+V} \\
&\text{+[NP}^1\text{ __ NP}^2\text{] where NP}^1\text{must be [+Animate]} \\
&\text{NP}^1\text{HATE NP}^2
\end{align*}$

(14) $\begin{align*}
&/\text{heytrad}/ \\
&\text{+N} \\
&\text{+Abstract} \\
&\text{+NP}^1\text{s __ (for NP}^2\text{)] where NP}^1\text{must be [+Animate]} \\
&\text{HATE}
\end{align*}$

These entries permit (15)-(20), but prohibit (21) and (22):

(15) John hates Bill.
(16) John hates his dog.
(17) John hates democracy.
(18) John's hatred for Bill
(19) John's hatred for his dog
We note that noun entries (7) and (14) look similar, as do the verbs (2) and (13). A lexical rule would explain the correspondences evident in these items. No rule is forthcoming to account for (12), however. Its phonological coincidence with (2) and (7) is strictly fortuitous.

2.1.2 DERIVATIONAL FUNCTIONS

So far we have said little about the character of lexical rules. We will make some strong claims about their nature. Our first observation is that some of them are functions. These rules have a domain and range, and they effect a one-to-one mapping of the former onto the latter. Lexical items are the arguments of the domain and lexical derivatives are the values of the range.

As the functions map lexical entries onto other lexical entries, they assign phonological features, syntactic features, and semantic features. A good example of this derivational process is the mapping of English cardinal numbers onto ordinal numbers. The function that performs this mapping in general assigns the suffix /θ/, makes the entry an adjective, and gives it the meaning ORDERED AS NUMBER N. This function relates (23) to (24). We will assume that the cardinals are nouns.
This function works transparently for all numerals ending in four, six, seven, eight, nine, ten, eleven, twelve, the teens, twenty and the other multiples of ten, hundred, thousand, million, billion, trillion, zillion, and zero. Ordinals derived from cardinal numbers ending in one, two, three, and five are exceptional. The vowel of fifth is lax, rather than tense as in five, although both nine and ninth show tense vowels. Rather than the expected *threeth, the proper ordinal is third. Numbers ending in one and two are totally suppletive phonologically as first and second. None of these items is irregular syntactically or semantically, however, so the ordinal rule will apply freely in its domain, assigning suppletive phonology where necessary.

The values of one function may be the arguments of another. For example, there is another function that yields reciprocals, as in:

(25) \[
\begin{array}{c}
\text{/forθ/} \\
+\text{N} \\
+\text{Count} \\
1/4
\end{array}
\]

This function turns ordinal adjectives into count nouns. In general, the phonology remains unaltered, but there are two exceptions. Rather than *secondN we find half, and the noun quarter is in free variation with fourthN, as in a quarter of the pie, (but not in quarter moon/*fourth moon or quarter dollar/*fourth dollar.)

This lexical process may be viewed as a composite function whose domain is the set of integers and whose range is the set of reciprocals. It is important to remember, however, that although this composite maps nouns onto other nouns, it proceeds via an adjectival stage.

2,1.2.1 FUNCTIONAL SUBREGULARITY AND IRREGULARITY

We have observed that functions show phonological suppletion. In fact, they also exhibit syntactic and semantic subregularities and irregularities of
various types.

It may be the case, for example, that although a function is semantically well-defined, not all lexical items with a particular semantic structure actually occur as members of the domain. A lexical process in English maps adjectives onto derivative verbs. Among the color adjectives we find such pairs as red/redden, white/whiten, black/blacken, yellow/yellow, gray/gray. It happens, however, that there are no verbs derived from beige, green, orange, scarlet, purple, violet, or pink. These are perfectly arbitrary gaps, since there is no semantic or phonological obstacle to the formation of verbs in these cases. (In Russian, for example, we find rozovet', "to turn pink" as a regular derivative of rozovyj, "pink").

The items of the lexicon record the fact that *pinken does not exist, just as they store the information that blacken does. Speakers do not create new words as freely as new sentences, even when a word-formation pattern clearly exists, as it does in this case.

Syntactic subregularity is evident in the color verbs which we have been discussing. We find, for example, that blacken is both transitive and intransitive. As an intransitive verb it means TO BECOME BLACK. For example, we have the sentence:

(26) The sky suddenly blackened.

As a transitive, however, it means TO CAUSE TO BECOME BLACK, as in:

(27) John blackened his face for the minstrel show.

We note, however, that the analogous redden is strictly intransitive:

(28) Mary's face reddened.

(29) *Jim reddened his fireman's hat.

Some functions show semantic subregularities. For example, the function suffixing -er to verbs generally yields human agents, as in driver and ruler.
A set of derivatives such as buzzer and freezer, however, are generally [-Human].

Finally, there are phonological subregularities. Most nominals derived from verbs end in -tion, as in the destruction of the city, but many end in -ment, as in the deployment of troops. Similarly, most of the agent nouns derived from verbs end in -er, as we have observed, but some end in -ent: we have adherent and resident rather than *adherer or *resider.

2.1.2.2 ALLOFUNCTIONS

For cases where functions show subregularities we will use a special term: allofunction. We will say that the function adding -tion to form nominals from verbs has an allofunction in -ment. Similarly, we will claim that the function mapping adjectives onto verbs has an allofunction that is strictly intransitive, while in the general case both transitives and intransitives occur in the range. And we will say that the function yielding human agents like ruler has a semantic allofunction which gives nonhuman agents like buzzer. When functions partially share phonological, syntactic, or semantic features, they may be allofunctions.

Like allophones and allomorphs, allofunctions are used to capture subregularities. By allowing a rule to incorporate subrules, a function to include subfunctions, we permit more economical statement of certain generalizations than would otherwise be possible. In particular, the notion of allofunction allows us to capture phonological regularities that extend over heterogeneous semantic material and semantic regularities which apply across phonological diversity.

2.1.3 FORMALISM

In order to facilitate discussion of derivational functions, we will
develop a formalism that permits brief reference to their major features. The symbolism \( F = X[W]_Y Z \) will be interpreted as claiming that the formative \( F \) is of syntactic category \( Z \), the result of applying function \( X \) to the underlying formative \( W \) of category \( Y \).

The symbolism \( X^\_YZ \) will be interpreted as naming the derivational function \( X \) whose domain is formatives of category \( Y \) and whose range is formatives of category \( Z \). The phonological and semantic aspects of function \( X \) may be referred to by the ordered pair \( (a, b) \), where \( a \) is the phonological contribution, for example a suffix, and \( b \) is the semantic contribution, for example the meaning AGENT. Thus, if we state that \( \text{driver} = X[\text{drive}_v]_N \), then the function \( X \) may be referred to with the ordered pair \( (-er, \text{AGENT}) \). Similarly, for \( \text{untie} = X[\text{tie}_v]_Y \), the function \( X \) is the ordered pair \( (\text{un-}, \text{REVERSAL}) \). Where allofunctions are involved, it may be useful to refer to only one member of the sound-meaning pair. Thus, we may mention the function \( \text{NOMINAL}_v^N \text{of destruction} = \text{NOMINAL}[\text{destroy}_v]_N \) and \( \text{deployment} = \text{NOMINAL}[\text{deploy}_v]_N \), ignoring temporarily the phonological details. Similarly, we may choose to reference the function yielding adjectives ending in the suffix \( \text{-able} \) (for example, perishable, profitable, and readable) by naming it simply as \( \text{-able}_v^A \), ignoring the fact that the meanings of its range are not uniform semantically. Since, as we will observe, some derivational functions of natural language do not alter syntactic category (in particular this seems to be the case for many prefixes), it will be convenient to abbreviate \( X^\_ZZ \) as \( X^\_Z \). By this convention, the derivational function giving \( \text{untie} \) could be briefly referred to as \( (\text{un-}, \text{REVERSAL})_v \).

We will call the phonological component of a function the \text{operator}. Hyphens will be used to indicate if the operator is a suffix, prefix, or infix. We have already noticed, by mentioning stress-shift, that more complex phonological processes than affixation may be involved. We will observe that zero operators
must also be admitted; that is, there are functions that have semantic and syntactic effect, but leave no phonological trace.

Implicit in the notation is provision for derivations of unlimited complexity. Since \( X[W_1]_Z \) is itself a formative, it can serve as input to another derivational function whose domain includes items of category Z. The derivational function \( A_{ZB} \) can apply to the formative \( X[W_1]_Z \), to yield the new formative \( A[X[W_1]_Z]_B \), which is itself a potential argument of a derivational function.

2.1.3.1 TYPES OF ALLOFUNCTIONAL VARIATION

There are two basic types of allofunctional variation. First, we find phonological allofunctions, functional variants which are identical in syntax and semantics to a dominant function, but different in sound. For example, the suffixes \(-ment\) and \(-tion\) both yield nominals from verbs. We find \( \text{recruit}_V/\text{recruitment}_N \) alongside \( \text{complete}_V/\text{completion}_N \), the derived meanings being parallel. The latter function seems to be the more productive, so we may say that \( (-ment, \text{NOMINAL})_{VN} \) is a phonological allofunction of the function \( (-tion, \text{NOMINAL})_{VN} \).

Second, we find semantic allofunctions, functional variants which are identical in syntax and phonology to a dominant function, but different in meaning. An example of this type is the function suffixing \(-er\) to yield agent nouns from verbs. The dominant pattern is for the derivative to be \([+Human]: \text{drive}_V/\text{driver}_N, \text{play}_V/\text{player}_N\). There are derivatives in this suffix which are \([-Human\], however, as in the \text{driver} used in golf or \text{record player}. Other examples are \( \text{buzz}_V/\text{buzzer}_N \) and \( \text{freeze}_V/\text{freezer}_N \). Here, although the \([+Human]\) meaning is sometimes available (as in a factory where buzzing or freezing is somebody's job), in general the inanimate reading pertains.

We may formally note this fact by claiming that \( (-er, \text{INANIMATE AGENT})_{VN} \) is a semantic allofunction of the dominant function \( (-er, \text{HUMAN AGENT})_{VN} \).
A third type of allofunctional variation that we might expect to find is the syntactic. Although easily definable in our notation, syntactic allofunctions seem much more rare. It is hard to imagine syntactic variation that does not involve semantic variation to a significant degree.

If we were to incorporate syntactic allofunctions into our theory, possible examples might be: \(-en_{AV}\), which yields both transitive and intransitive verbs; \(-able\), which applies to both verbs and nouns (in readable and objectionable); and \(-dis-\), which applies to nouns, verbs, and adjectives in the basic meaning \(\text{NEGATIVE} \) (disrepair, disobey, disproportionate).

Returning to the major types, we note that a given dominant function may have both phonological and semantic allofunctions. We observed earlier that the function \((-er, \text{HUMAN AGENT})_{VN}\) has a semantic allofunction. In fact, things are more complicated. Either of the agentive meanings may be realized by the suffix \(-ent\) (almost always in complementary distribution with \(-er\)). Thus, we observe:

\[
\begin{align*}
(30) \quad \text{suffix } -er \text{ in the meaning HUMAN AGENT (driver)} \\
(31) \quad \text{suffix } -ent \text{ in the meaning HUMAN AGENT (adherent)} \\
(32) \quad \text{suffix } -er \text{ in the meaning INANIMATE AGENT (buzzer)} \\
(33) \quad \text{suffix } -ent \text{ in the meaning INANIMATE AGENT (pollutant)}
\end{align*}
\]

A survey of the lexicon discloses that (30) is the clearly dominant function. We expect its derivatives to be readily associated with one another and easily learned by speakers. Variants (31) and (32) are phonological and semantic allofunctions of (30), respectively. We anticipate that their derivatives will be less numerous and somewhat less readily comprehended and learned, since they involve deviations from the basic pattern. Type (33) derivatives are doubly removed from (30) and thus should be significantly more difficult
and less numerous. [See the end of section 4.2.3 for lists substantiating these assertions.] Since (33) is an allofunction of an allofunction (either (31) or (32),) it constitutes a very minor class.

It must be stressed that assertions about allofunctional variation follow from examination of the lexicon as a whole, not from the consideration of just a few examples. Suppose we find that:

(34) suffix A has the meaning P in certain words
(35) suffix A has the meaning Q in certain words
(36) suffix B has the meaning Q in certain words.

We might conclude from this data that (34) and (35) are allofunctionally related, and that (35) and (36) are as well, if the words cited as evidence are of appropriate syntactic categories. We are not free to conclude which is an allofunction of which, however, until we establish dominance by looking at the entire lexicon. If \((A,Q)_{XY}\) is the dominant function, then \((A,P)_{XY}\) and \((B,Q)_{XY}\) are semantic and phonological allofunctions, respectively, of the dominant. We expect these to be less numerous in range, though greater in range than some function \((B,P)_{XY}\), if such exists, since the latter would be doubly variant from the dominant pattern. If either \((A,P)_{XY}\) or \((B,Q)_{XY}\) is dominant, however, the existence of \((A,Q)_{XY}\) does not suggest any necessary relationship (by transitivity) between the functions described by (34) and (36).

Not all arrays of the type (30)-(33) will be described as one function with allofunctions, For example, we find:

(37) prefix de - in the meaning PRIVATIVE (delouse, defrost)
(38) prefix un - in the meaning PRIVATIVE (unmask, unfrock)
(39) prefix de - in the meaning REVERSATIVE (detoxify, de-escalate)
(40) prefix un - in the meaning REVERSATIVE (unglue, unwrap)
We note that the syntactic categories relevant in these functions are different. Here (37) and (38) map nouns onto verbs, while (39) and (40) map verbs onto verbs. A survey of the lexicon shows that \((\text{de-}, \text{PRIVATIVE})_N\) is dominant and the prefix \(\text{un-}\) is a phonological variant in the PRIVATIVE sense. In the REVERSATIVE case, however, \((\text{un-}, \text{REVERSATIVE})_V\) is dominant, and here \(\text{de-}\) is a phonological allo-function.

We note in passing, however, that there is evidence that might be taken as arguing against this bifurcation. The prefix \(\text{dis-}\) appears in both PRIVATE and REVERSATIVE meanings, suggesting that there may be a unified NEGATIVE function at work here. The evidence is fairly substantial, but not overwhelming. The prefix \(\text{dis-}\) shows the PRIVATE meaning in \text{disillusion} and \text{disspirit}, from the nouns \text{illusion} and \text{spirit}. It is REVERSATIVE in \text{assemble}/\text{disassemble}, \text{associate}/\text{disassociate}, \text{place}/\text{displace}, \text{embark}/\text{disembark} (cf. \text{debark}, \text{deplane}), \text{connect}/\text{disconnect}, \text{engage}/\text{disengage}, and \text{charge}/\text{discharge}. The fact that one prefix unifies both cases seems to argue somewhat for one function.

\(\text{Dis-}\), however, is an extremely variable prefix, applying to all the major syntactic categories in the general NEGATIVE meaning. For adjectives it has the meaning \text{NOT A}, or OPPOSITE OF A: \text{similar} \(_A\)/\text{dissimilar} \(_A\), \text{passionate} \(_A\)/\text{dissapassionate} \(_A\), \text{honest} \(_A\)/\text{dishonest} \(_A\), \text{consonant} \(_A\)/\text{dissonant} \(_A\), \text{loyal} \(_A\)/\text{disloyal} \(_A\), \text{proportionate} \(_A\)/\text{disproportionate} \(_A\), \text{courteous} \(_A\)/\text{discourteous} \(_A\), \text{continuous} \(_A\)/\text{discontinuous} \(_A\), \text{respectful} \(_A\)/\text{disrespectful} \(_A\), \text{advantageous} \(_A\)/\text{disadvantageous} \(_A\), \text{agreeable} \(_A\)/\text{disagreeable} \(_A\). (Note that the latter does not come from \text{disagree}.) For nouns, the prefix has the basic meaning OPPOSITE OF N: \text{use} \(_N\)/\text{disuse} \(_N\), \text{repair} \(_N\)/\text{disrepair} \(_N\), \text{concord} \(_N\)/\text{discord} \(_N\), \text{harmony} \(_N\)/\text{disharmony} \(_N\), \text{union} \(_N\)/\text{disunion} \(_N\), \text{order} \(_N\)/\text{disorder} \(_N\), \text{affection} \(_N\)/\text{disaffection} \(_N\), \text{repute} \(_N\)/\text{disrepute} \(_N\). When applied to verbs, in addition to the REVERSATIVE meaning, \(\text{dis-}\) may have the meaning OPPOSITE OF V: \text{encourage} \(_V\)/\text{discourage} \(_V\), \text{obey} \(_V\)/\text{disobey} \(_V\), \text{qualify} \(_V\)/\text{disqualify} \(_V\), \text{approve} \(_V\)/\text{disapprove} \(_V\).
persuade_/dissuade_, prove_/disprove_. It may be that the notion of syntactic allofunction should be extended to incorporate all these NEGATIVE cases. If we consider this NEGATIVE meaning to be underlying, we might argue that PRIVATIVE and REVERSATIVE are merely semantic allofunctions of an underlying (dis-, NEGATIVE) function unspecified for syntactic category. There seem to be fairly few PRIVATIVE and REVERSATIVE cases for dis-, however, so the evidence does not seem to support its dominance.

In conclusion, we observe that not all semantic and phonological similarities are allofunctional, just as not all similarities in syntax and phonology are properly captured by braces. A clear case where we do not wish to set up allofunctions is:

(41) prefix /äenti/ in the meaning BEFORE (antenuptial)

(42) prefix /äenti/ in the meaning AGAINST (anti-war).

Both prefixes appear to yield adjectives, but their derived meanings seem quite unrelated and their distribution is not complementary (antechristian/antichristian and antehistoric/antihistoric). There is the additional decisive phonological evidence that a careful pronunciation may diphthongize the prefix in (42) as /äentay/, while no such pronunciation can occur in (41).

Similarly, -en (dark /darken) is not a semantic allofunction of -en (wood /wooden), although suffixes are identical in sound. The fact that the syntactic categories are different immediately argues against any allofunctional unification. [See Section 5.3.1 for more discussion of problems in establishing allofunctional relationships.]

2.1.4 ANALOGIES

An important tool which we will employ repeatedly in the investigation which follows is analogy. When formatives are parallel in structure, particularly in semantics, we will often display them proportionally. We have
observed that the de-adjectival verbs *yellow* and *whiten* are semantically and syntactically similar, although one is a zero-derivative and the other comes by affixation. We may express their affinity by the proportion:

\[(43) \text{yellow}_A : \text{yellow}_V :: \text{white}_A : \text{whiten}_V\]

As another example, observe that in the following sentences the suffix *-ing* added to verbs produces a noun with the meaning CAPACITY TO V:

\[(44) \text{John's thinking is confused.}\]
\[(45) \text{John's swimming is good.}\]
\[(46) \text{John's painting is creative.}\]
\[(47) \text{John's singing is execrable.}\]
\[(48) \text{John's hearing is bad.}\]

But not all verbs follow this pattern:

\[(49) \text{*John's speaking is unclear.}\]
\[(50) \text{*John's remembering is impaired.}\]
\[(51) \text{*John's pronouncing is excellent.}\]
\[(52) \text{*John's seeing is blurred.}\]

Instead we find:

\[(53) \text{John's speech is unclear.}\]
\[(54) \text{John's memory is impaired.}\]
\[(55) \text{John's pronunciation is excellent.}\]
\[(56) \text{John's sight is blurred.}\]

Using proportions, we may say that in this context:

\[(57) \text{hear}_V : \text{hearing}_N :: \text{speech}_V : \text{speech}_N :: \text{see}_V : \text{sight}_N\]

We must be careful to use analogies in context, however, since they do not take account of homophony. Sentence (53) is actually ambiguous, since *speech* may be interpreted as either a mass noun, as in (44), or a count noun, disambiguated by the plural:
(58) John's speeches are unclear.

For the latter speech we find other analogies. For example, we have:

(59) John spoke well. I liked his speech.
(60) John talked well. I liked his talk.
(61) John sang well. I liked his song.

Song and talk do not belong in analogy (57), however, since sentence (47) is not synonymous with:

(62) John's song is execrable.

Still, song is morphologically related to sing just as much as singing is, although by a different pattern.

Analogy provides insight into the structure of lexical items. We find, for example, that the function (-able, ABLE TO BE V'ED)\textsubscript{VA} takes the verbs understand and perceive as arguments, yielding the regular understandable and perceivable, and the slightly exceptional variant perceptible. These formatives can be set up in analogy (65), as demonstrated by sentences (63)-(64):

(63) I understand your remark; it is understandable now.
(64) I perceive the signal; it is perceivable now.

(65) \text{understand}_v : \text{understandable}_a :: \text{perceive}_v : \text{perceivable}_a

We note, however, that sentences (66)-(67) are strange:

(66) *I hear the conversation; it is hearable now.
(67) *I see the flag; it is seeable now.

Instead we find:

(68) I hear the conversation; it is audible now.
(69) I see the flag; it is visible now.

With sentences (63)-(64), and sentence (70), we can continue the analogy as (71):
I can read the sentence; it is readable now.

(70)  I can read the sentence; it is readable now legible.

(71)  read_{v} : readable_{a} :: read_{v} : legible_{a} :: see_{v} : visible_{a} :: hear_{v} : audible_{a}

These analogies are evidence for the view that the stems leg-, vis-, and aud- mean READ, SEE, and HEAR.

2.1.4.1 SINGULAR RELATIONSHIPS

While positing analogies as a major source of lexical structure, we are forced to admit that there are many clearly derived formatives that participate in one-time, non-analogical relationships with their derivational sources.

Among such recalcitrant examples are: culpable/culprit, bomb/bombard, medium/mediate, space/expatiate, grace/ingratiate/gratitude/gratify, official/officiate, instance/instantiate, instant/instantaneous, furnish/furniture, glass/glazier, joy/enjoy, prejudge/prejudice, judge/judicate/judicial, humble/humiliate, difference/differentiate, decant/decanter, luxury/luxuriate, terminate/terminal, inherit/heritage, sewer/sewage, bible/biblical, damn/condemn, preface/prefatory, paraphrase/paraphrastic, ample/amplitude, plenty/plenitude, enemy/inimical, parish/parishioner, conscience/conscionable. These are just a few of the problematical relationships which have arisen in this research.

Generalizations based upon singular relationships are certainly less well-founded than those for which analogies exist, but it must be noted that any of these singular relationships may serve as the nucleus for future analogy. A good example is the formation of doubleton on the pattern single-singleton. Words like orphan/orphanage look isolated until we pair them with vicar/vicarage and hermit/hermitage.
2.1.5 LEXICAL DEEP STRUCTURE

The final concept which we will explore here before turning to detailed examples arises naturally following a discussion of analogy: this is the notion of **lexical deep structure**. We observe that some words show evidence of the repeated application of derivational functions. Note, for example, the following sentence:

(72) John commented on the indestructibility of Hoover Dam; he claims it is quite indestructible.

This sentence suggests the existence of a process suffixing -ity to adjectives. Ignoring its meaning for the moment, we will claim that the following functional analysis holds:

(73) indestructibility = -ity [indestructible]_N

The adjective argument is itself a derivative, however, as shown by:

(74) The dam is indestructible — or at least hardly destructible.

This sentence suggests that the following analysis holds:

(75) indestructible = in-[destructible]_A

But destructible itself can be morphologically atomized, since we find the sentence:

(76) The dam might be destructible; it could be destroyed.

From this evidence we derive the analysis:

(77) destructible = -able[destroy]_V

The analyses taken together assert that the full structure of (73) should be:

(78) indestructibility = -ity[in-[able[destroy]]_V]_A

We will call the analysis (78) the deep structure of the lexical derivative *indestructibility*. In Chapter Three we will develop argument patterns which
establish its validity, and in particular justify the ordering of functions which we have claimed.

2.2 EXAMPLES OF STRUCTURED LEXICAL ANALYSIS

The remainder of this chapter is devoted to analyses which employ the concepts that we developed in the first section. The examples are largely drawn from English noun morphology. We will discuss the so-called "derived nominal" and distinguish two major patterns of interpretation for it. Next we will examine zero-derivation and note that zero-derived nouns are similar in interpretation to derived nouns of the nominal type. Finally, we will explore the semantics of stress-shifted deverbal derivatives, observing further parallels with the preceding types of derivation.

2.2.1 DERIVED NOMINALS

We observed in section 2.1.4 that song is a derivative of the verb sing by semantic analogy with speech and talk. We note further that dance and performance also belong in this analogy:

(79) John danced well. I liked his dance.
(80) John performed well. I liked his performance.

These nouns are both [+count], as shown by the fact that the sentences are not substantially altered if we substitute plurals:

(81) John danced well. I liked his dances.
(82) John performed well. I liked his performances.

The nouns dance and performance differ syntactically, however. We may say (83), but not (84):

(83) I liked his performance of the sonata.
(84) *I liked his dance of the ballet.
The lexical item performance is marked syntactically as taking both of-phrases and preposed possessives, while the item dance takes only the latter.

What is most striking about (83), however, and of crucial interest here, is its semantic interpretation. The sentence is ambiguous as it stands, meaning either (85) or (86):

(85) I liked the fact that he performed the sonata.
(86) I liked the way that he performed the sonata.

If we delete of the sonata, to give (87),

(87) I liked his performance.

interpretation (86) still pertains, but the factive interpretation does not survive.

When derived nouns receive factive interpretation, we will call them derived nominals, or nominals for short. Performance is a nominal, while dance and song are strictly derived nouns. It is significant that this definition is semantic, rather than phonological. As we will observe in the next section, phonology is only a partial indicator of the semantics underlying nominal morphology.

2.2.1.1 THE FEATURE [COUNT] AND INTERPRETATION

Consider the following sentences and their interpretations:

(88a) Martha's decision surprised me.
(88b) Martha's indecision surprised me.
(88c) Martha's defection surprised me.
(88d) Martha's dejection surprised me.
(88e) Martha's rejection surprised me.

These five sentences are apparently identical in surface-structure syntax. Each is a simple transitive sentence of the obvious sort:
Despite the clear isomorphism at the surface, however, these sentences differ radically in interpretation, as shown by the following paraphrases:

(90a) What Martha decided (to do) surprised me.
(90b) The fact that Martha was (so) indecisive surprised me.
(90c) The fact that Martha defected surprised me.
(90d) The fact that Martha was (so) dejected surprised me.
(90e) The fact that Martha was rejected (by X) surprised me.

Some additional interpretations are possible, for example:

(91a) The way that Martha defected surprised me.
(91b) The fact that Martha rejected (our offer) surprised me.

The various interpretations of sentences (88) do not follow obviously from the simple surface-structures of (89). We will seek to explain them derivationally by attempting to isolate those features of the lexical items that condition semantic interpretation.

We begin by observing that the nouns of (88) vary in the specification of a lexical feature which is solidly established, namely the feature [count].

For example, (88a) is still grammatical if the subject is pluralized, but (88b) is not:

(92a) Martha's decisions surprised me.
(92b) *Martha's indecisions surprised me.
Thus, the noun decision is [+count], while indecision is [-count]:

(93a) Did Martha make any decisions?
Some, but not many.

(93b) Did Martha show any indecision?
Some, but not much.

As a step toward explicating the differences in interpretation between (88a) and (88b), we may begin to catalogue these lexical facts. The following are partial lexical entries which summarize this information:

(94a) decision\textsubscript{N}: [+count], decide\textsubscript{V}

(94b) indecision\textsubscript{N}: [-count], indecisive\textsubscript{A}

Entry (94a) states that the lexical item decision is a count noun derivationally related to the verb decide. Entry (94b) claims that indecision is a mass noun derivationally related to the adjective indecisive. The latter claim is supported by the fact that indecision is synonymous with the more transparently derived indecisiveness:

(95) Martha's indecisiveness surprised me.

With the formative defection of (88c) we find that either specification of the feature [count] will produce a grammatical result:

(96a) Was there any defection to the West last month?
Some, but not much.

(96b) Were there any defections to the West last month?
Some, but not many.

These uses seem to be slightly different, where defection of (96a) refers to a continuing process, while that of (96b) denotes discrete events. We might propose two partial listings for defection, one count and the other mass:

(97a) defection\textsubscript{N}: [-count], defect\textsubscript{V}, PROCESS

(97b) defection\textsubscript{N}: [+count], defect\textsubscript{V}, EVENT
Continuing with this analysis, we find that the noun dejection in (88d) is strictly [-count]:

(98) *Martha's dejections surprised me.

Unlike the phonologically similar formative defection, the noun dejection comes from an adjective, not a verb:

(99) dejection$_N$: [-count], dejected$_A$

For most speakers the verb deject is either impossible or archaic. Evidence that entry (99) is correct is the fact that dejection is synonymous with the transparently derived dejectedness:

(100) Martha's dejectedness surprised me.

Finally we come to the ambiguous (88e) containing the noun rejection. We observe first that (88e) has a variant form, especially with conjoint NP's:

(101a) ?Martha and her sister's rejection surprised me.

(101b) The rejection of Martha and her sister surprised me.

Observe that the latter sentence, in contrast to (88e), has no ambiguity; it has no interpretation analogous to (91b), since it cannot mean:

(102) The fact that Martha and her sister rejected (our offer)

surprised me.

Note further that (88e) may be pluralized, but the variant form may not:

(103a) Martha's rejections surprised me.

(103b) *The rejections of Martha surprised me.

The plural form (103) is unambiguous, with interpretation close to (102)

(104) It surprised me that Martha (repeatedly) rejected (our offer.)

In fact, rejection of (103a) may be interpreted as "written notice of rejection," "verbal expression of rejection," etc., as in:
(105) Jason received five rejections and two acceptances in the mail this morning.

Here rejection is not only [+count], but also [+concrete]. A similar type of meaning-extension is found in:

(106) The Supreme Court's decision is twenty pages long.

[Chomsky discusses examples of this type (e.g., proof) in fn 11, pp. 217-8 of "Nominalization"].

We may summarize these observations by establishing two partial lexical entries, one count and the other mass. The count noun is also concrete, meaning EXPRESSION OF V'ING, with Martha read as the subject. The mass noun is nominal; we will return to its interpretation in the following section.

(107a) rejection_N: [-count], reject_V, NOMINAL

(107b) rejection_N: [+count], [+concrete], reject_V, EXPRESSION

2.2.1.2 S-INTERPRETATION AND NP-INTERPRETATION

Comparing lexical entries with interpretations, we may begin to make some general theoretical observations. We note that the feature [+count] appears to be associated with interpretations of one type, [-count] with another.

The count noun derivatives yield what we will call Noun-Phrase Interpretations. We observe that sentence (88a), containing the count noun decision, has interpretation (108):

(88a) Martha's decision surprised me.

(108) What Martha decided surprised me.

The what-clause comes from a dummy NP' modified by an S_1 containing Martha as subject and decide as verb:
Thus, sentence (88a) may be followed logically by sentence (110a) or (110b) or (110c), depending upon the content of the embedded S:

(110a) She decided to send George to boarding school.
(110b) She decided that meat was too expensive.
(110c) She decided that the President should be impeached.

If sentence (88a) is pluralized as:

(111) Martha's decisions surprised me.

the interpretation is accordingly pluralized, although the morphology of interpretation (112) does not manifest the difference:

(112) What (pl) Martha decided surprised me.

In this case, the dummy NP' is pluralized and multiple S's are embedded.

Thus, (111) may be followed by:

(113) She decided that George should go to boarding school and that Alice should enter kindergarten.

Another example which we have seen where a derived count noun receives NP-interpretation is in the case of rejection in:

(114) Jason received a rejection in the mail this morning.

Part of the interpretive tree will be:
Here the NP in the higher VP means "that in which (Harvard) rejects (Jason)" or "the letter of rejection." If, as in the case of (92), rejection is pluralized, a plural marker is accordingly attached to the NP' in interpretation.

Derived mass nouns which are nominal, on the other hand, induce Sentence-Interpretation. Thus, for example, sentence (88c) receives interpretation as (116):

(88c) Martha's defection surprised me.

(116) That Martha defected surprised me.

Here there is no NP', since NP directly dominates S1 when defection is [-count]:

(117)
Note that this nominal comes from an adjective, not a verb. Case (88b) is similarly interpreted, with _indecisive_ replacing _dejected_ under the node _Adj_.

If we consider the entry _rejection_, we find a number of possible interpretations. We have already discussed the count option. If the noun is mass and nominal, two basic S-interpretations are possible, depending upon what is felt to have been deleted from the syntax of (88e). Thus, we may have the passive interpretation:

(119) Martha's rejection (by Radcliffe) surprised me.

Or we may find the active interpretation:

(120) Martha's rejection (of our offer) surprised me.

If context indicates that the deleted material is that of (119), then (88e) will be interpreted with Martha as the object of the embedded _S_

(121)

If, on the other hand, the deleted material provided by context is that of (120), Martha will be interpreted as the subject of the embedded _S_

(122)
What is most important is that the feature [-count] is associated with S-interpretation. This is characteristic of nominals, whether they come from adjectives (indecision, dejection) or from verbs (defection, rejection).

The distinctions which we have developed allow us to explain some morphologically ambiguous sentences. Consider, for example:

(123) The committee's determination angled Bill.

This sentence may mean either (124) or (125):

(124) That the committee determined what it did angered Bill.

(125) That the committee was (so) determined angered Bill.

Note that if we pluralize (123) as (126), there is no interpretation of type (125):

(126) The committee's determinations angered Bill.

In interpretation (124), determination is read as a count derivative of the verb determine. This meaning of determination is in semantic analogy with the noun decision discussed above:

(127) \text{determine}_v : \text{determination}_n :: \text{decide}_v : \text{decision}_n

The non-count interpretation of determination is a derivative of the adjective determined, however, and is in semantic analogy with stubbornness:

(128) \text{determined}_a : \text{determination}_n :: \text{stubborn}_a : \text{stubbornness}_n

Or consider the ambiguous sentence:

(129) Nathan's selection pleased John.

This can mean either (130) or (131):

(130) That Nathan selected what he did pleased John.

(131) That Nathan was selected (by X) pleased John.

The first is the NP-interpretation, and it still pertains if selection is pluralized. The second is the factive nominal interpretation for the non-
count reading of the noun.

A third ambiguous example is:

(132) The group's organization was remarkable.

One interpretation follows from the de-adjectival entry:

(133) organization\textsubscript{N}: [-count], organized\textsubscript{A}, NOMINAL

This nominal is in analogy with disorganization, from the adjective dis-organized. In this meaning, (132) is interpreted as:

(134) The fact that the group was (so efficiently) organized was remarkable.

A second interpretation follows from the deverbal entry:

(135) organization\textsubscript{N}: [-count], organize\textsubscript{V}, NOMINAL.

In this meaning, sentence (132) is read as:

(136) The fact the the group was organized (by X) was remarkable.

A third interpretation follows from a count reading of organization, where it is in analogy with corporation:

(137) organize\textsubscript{V}: organization\textsubscript{N} :: incorporate\textsubscript{V}: corporation\textsubscript{N}

Only this reading survives, of course, under pluralization:

(138) The group's organizations were remarkable.

We will return later in this chapter to the semantics of NP-interpretation for nouns like organization that are homophonous with derived nominals. We will observe that semantic patterns are shared with stress-shifted nouns and zero-derivatives, to which we now turn.

2.2.1.3 THE STRUCTURE OF NOMINAL INTERPRETATION

We have claimed that there exists a level of lexical deep structure.
One consequence of this view is that attitude and resignation, though both nouns with respect to the phrase structure rules of the base, are seen to have differing underlying lexical representations. Attitude is a lexical primitive—its lexical surface structure and deep structure are the same, since it has not undergone derivation. Resignation, on the other hand, has the deep structure \(-\text{tion}\left[\text{resign}\right]_N\), showing its ultimately verbal source.

We observed in the previous section that the surface structure syntax of sentences containing derived and underived nouns may be the same. Thus, there is no phrase structure difference between the trees representing the sentences:

(139) John's attitude pleased Bill.
(140) John's resignation pleased Bill.

These two sentences have identical syntactic (and thus transformational) histories, except for lexical insertion.

When these sentences are interpreted by the semantic component, however, the interpretation must somehow account for the fact that sentence (140) has the interpretation (141):

(141) That John resigned pleased Bill.

while sentence (139) has no such reading.

In the theory which we have been elaborating, the explanation of (141) is not to be sought in some feature of syntactic deep structure, but rather in the lexical deep structure of the surface item resignation. The fact that this item is marked [+Nominal] in the lexicon (while attitude receives no such feature) is the distinction necessary to account for the interpretive facts.

It is premature to make any claims as to how the semantic interpretation of nominals actually proceeds, and it is not even totally clear whether the
interpretation occurs at a level of deep structure or at surface structure. The observations which follow would appear to fit into either system of interpretation.

We have related nominals to sentences of various types. For example, where V is intransitive, the nominal structure

\[(142) \text{B's } V_{\text{Nom}}\]

is paired with a sentential reading

\[(143) \text{[B } V]\text{s'}\]

Thus, the sentences

\[(144) \text{John's resignation pleased Bill.} \]

\[\text{death, defection, departure, arrival, failure, return, retirement, enlistment}\]

have the interpretations

\[(145) \text{That John resigned pleased Bill.} \]

\[\text{died, defected, departed, arrived, failed, returned, retired, enlisted}\]

Exactly how these interpretations acquire tense (\text{died} = \text{die} + \text{Past}) is a problem which we will overlook. Note that the nominal in the sentence:

\[(146) \text{John's resignation will please Bill.}\]

still receives S-interpretation, but the proper embedded sense is unclear:

\[(147) \text{That John } \{\text{resigned} \}\text{ will please Bill.} \]

The sentence:
(148) John's resignation might please Bill.

is even more problematical.

If the nominal in question comes from a transitive verb, the proper
interpretation of

(149) B's \( V_{\text{Nom}} \)

is generally of the type

(150) \([X \ V \ B]_S\) where \(X\) is an unspecified subject.

Thus, the sentences:

(151) John's extradition pleased Bill.
   redemption
   enslavement
   appointment
   election
   canonization
   conviction
   refutation

mean:

(152) That \(X\) extradited John pleased Bill.
   redeemed
   enslaved
   appointed
   elected
   canonized
   convicted
   refuted

The nominal phrase

(153) B's \( V_{\text{Nom}} \) of C

to be interpretable must have \(V\) as transitive. The phrase is read with \(C\) as
the object of the sentential correspondent:

(154) \([B \ V \ C]_S\)

Thus, we find that the sentences:

(155) John's invitation of Elizabeth pleased Bill.
   recognition
   endorsement
   abduction
corruption
detention
admonition

are read as:

(156) That John invited Elizabeth pleased Bill.
recognized
endorsed
abducted
corrupted
detained
admonished

Finally, the deverbal nominal phrase:

(157) the $V_{\text{Nom}}$ of $B$

where $V$ is again transitive is interpreted with $B$ as the object in the

sentential correspondent, with subject unspecified, like $B$'s $V_{\text{Nom}}$

(158) $\left[ \begin{array}{c} X \ V \ B \end{array} \right]_{S}$

Examples are:

(159) The destruction of the city pleased Bill.
renovation
invasion
incorporation
naming
burning

which are interpreted as:

(160) That $X$ destroyed the city pleased Bill.
renovated
invaded
incorporated
named
burned

Note that naming and burning, though gerundive in form, function like nominals.

Where the nominal to be interpreted is de-adjectival, a sentence interpre-

tation again follows. The phrase:

(161) $B$'s $A_{\text{Nom}}$

is interpreted as corresponding to the sentence:
(162) \[ B \text{ be } A \]_S

Examples are:

(163) John's derangement pleased Bill.
   exhaustion
   corruption
   devotion
   laziness
   stupidity
   tolerance
   restlessness

where the interpretation is:

(164) That John was deranged pleased Bill.
   exhausted
   corrupt
   devoted
   lazy
   stupid
   tolerant
   restless

To conclude, in general derived nominal phrases receive S-interpretation by a semantic rule that is governed by lexical features. The sentence trees of section 2.2.1.2 are all semantic interpretations induced by lexical deep structure.

2.2.2 ZERO-DERIVATION

It is relatively easy to argue for derivational functions which leave behind distinct morphological traces like un-, -able, -ment, and -tion. It is more difficult to deal with functions which have zero operators.

One such function maps adjectives onto verbs, as in the verb dry from the adjective dry. The following adjectives have associated homophonous verbs: tame, clear, smooth, still, hollow, empty, dull, clean, obscure, dirty, muddy, blind, numb, tidy, free, warm, ready, better, quiet. In all these cases the verb is transitive, meaning TO CAUSE TO BECOME ADJ. Another set of adjectives gives verbs which are strictly intransitive, meaning TO
BECOME ADJ: faint, sour, mellow, sober, pale. A third set of adjectives gives verbs which may be either transitive or intransitive, like dry: open, dim, thin, tan, slow, cool. In these cases, either meaning is possible, depending upon transitivity.

We might represent the derivational functions that yield these verbs as follows:

(165) \((\emptyset, \text{BECOME})_{AV}\)

(166) \((\emptyset, \text{CAUSE TO BECOME})_{AV}\)

We will examine in Chapter Three arguments about course derivation, but it is important to note at this point that support for derivation of the verb from the adjective, rather than the reverse, comes from the fact that these functions appear to be allofunctions of \(-en_{AV}\), whose directionality is clear morphologically. Examining the verbs associated with the adjectives thin, thick, tan, red, narrow, wide, better, worse, we find the set thin, thicken, tan, redden, narrow, widen, better, worsen, all meaning TO BECOME ADJ or TO CAUSE TO BECOME ADJ. The analogy should be clear. Note also that by positing the adjectives as fundamental, we can naturally explain the appearance of comparative morphology in the verbs better, worsen, and lessen.

2.2.2.1 THE SEMANTICS OF ZERO-DERIVATIVE NOUNS

We have observed that the zero-derivation of verbs from adjectives is a semantically regular operation roughly expressed by the two functions (165) and (166). Other zero operations are the derivation of verbs from nouns, as in fish, or water, and the derivation of nouns from verbs, for example exhibit, and guide.

Concentrating on zero-derivative nouns, we note a variety of semantic
relations between derived nouns and their underlying verbs; there is no single unified set of functions, although the set of patterns we find shows some regularity. For example, in the sentences (167) and (168):

(167) Mary washed the laundry.
(168) Mary hung out the wash to dry.
we find that the noun wash is morphologically related to the verb wash. In fact, sentence (168) is interpreted as:

(169) Mary hung out that which she had washed.
Thus, as a noun, wash means THAT WHICH IS V'ED. Similarly, we find that in the sentence (170) and (171),

(170) John is catching fish.
(171) He has his catch on a string.
a parallel relationship holds between verb and noun. Sentence (171) is interpreted as:

(172) He has that which he has caught on a string.
Here, catch as a noun means THAT WHICH IS V'ED. Like these two examples are the nouns reply, answer, and retort from corresponding homophonous verbs. In the sentences:

(173) John replied.
(174) His reply was brief.
we find that the noun of (174) may be interpreted to give:

(175) That which he replied was brief.
Again, we find deverbal zero-derived nouns meaning THAT WHICH IS V'ED. Brew, roast, and stew also fall into this group.

There are other semantic patterns. The noun guide, for example, means either THAT WHICH V'S or ONE WHO V'S, as in:
Elizabeth bought a guide to the museum. 

Sally works as a guide for the park service.

Bore as a noun has both these meanings, as in:

John's latest novel is a bore.

Two bores came to my cocktail party.

Cheat has only the [+Human] interpretation:

I don't like playing cards with cheats.

Other meanings are not so concisely expressible. For example, the nouns love, hate, doubt, trust, regret, hope, desire, disgust, and dislike seem to share the common meaning of EMOTION. Disgust and dislike come from very different verbs syntactically, however:

John dislikes beer.

Beer disgusts John.

Further categories are needed to account for examples like dump and study, place where one v's, and walk, that on which one v's. Many zero-derivatives have multiple interpretations. Support, for example, has a [+Concrete] meaning as a [+Count] noun, but an abstract meaning as a mass noun:

The bridge soon fell, due to the weakness of its supports.

The proposal failed, due to lack of support from the faculty.

As we will observe when we return to zero-derivation in Chapter Three, many nouns are of the type hiss, scream, howl, laugh, grin, which may be semantically expressed as INSTANCE OF V'ING. Again, however, the facts are complicated, since we find the meaning of INSTANCE in (185), but not (186):

John made a funny smile.

John has a funny smile.

The following table summarizes some of the main meanings that we have
encountered:

(187) THAT WHICH IS V'ED: wash, catch, take, haul, kill, brew,
stew, roast, display, award, exhibit, request, reply, answer,
retort
THAT WHICH V'S: press, punch, stamp, pump, prop, support,
brace, release, lock, alarm, appeal, attempt, call
ONE WHO V'S: cook, judge, guide, tease, scold, cheat, bore,
flirt, gossip, spy, shadow, guard

We will note that these patterns are repeated in the noun derivatives we consider in the following sections.

2.2.3 SEMANTICS AND THE STRESSED SYLLABLE RULE

In The Sound Pattern of English Chomsky and Halle exhibit a phonological mechanism for deriving nouns from verbs by shifting stress forward, as in transfer, permit, and export from the verbs transfer, permit, and export. It is natural to ask, given the framework which we have developed, whether the stress-shift function has any consistent semantic content.

Consider the noun retread, which means RETREADED TIRE. This word appears to have been derived by the stressed syllable rule. Its source is the verb retread, and the meaning of RETREADED TIRE follows from the underlying significance THAT WHICH IS V'ED. Similarly, a reject is THAT WHICH IS REJECTED and an import is THAT WHICH IS IMPORTED.

The verbs convert (meaning TO CAUSE TO ADOPT A NEW RELIGION) and convict require [+Human] objects, so it is not surprising that their stress-shifted derivatives convert and convict share the feature [+Human], meaning ONE WHO IS V'ED rather than THAT WHICH IS V'ED.
On the other hand, we find agentive cases where the derivative is interpreted as ONE WHO V'S. Examples of this pattern are rebel which means ONE WHO REBELS, and escort which means ONE WHO ESCORTS.

We observed earlier that disgust is a zero-derivative of the verb disgust, meaning EMOTION. Like it is torment from the verb torment:

(188) The pain tormented Alfred.

(189) Alfred's torment was visible in his weary eyes.

As with zero-derivatives, we find several semantic patterns. Some of the main meanings are shown in the following table:

(190) THAT WHICH IS V'ED: reject, import, export, insert, reprint, record, abstract, augment, fragment, misprint, extract, compound, retread

ONE WHO IS V'ED: convict, suspect, pervert, convert, conscript

ONE WHO V'S: rebel, escort, consort, deviate

There is also a group which refers to abstract results: progress, regress, conflict, increase, decrease, concert ("harmony"), protest. We find, finally, insult, torment, construct, transport, and ferment which are related to underlying verbs in still other ways.

Examination of stress-shift shows, then, that although it is a phonologically unified function syntactically mapping verbs onto nouns, it is semantically heterogeneous in range. This is not to say that the semantic categories which it yields are arbitrary, however. We observe many similarities with zero-derivatives, in fact, enough to strongly suggest that stress-shift is basically a phonological allofunction of zero-derivation. Note, for example, the complementary distribution. Stress-shifted nouns are not contrasted with
unshifted nouns. All this suggests that disyllabic nouns derived from verbs will be stress-shifted if this is phonologically possible. Semantically, they will be treated like other zero-derivatives.

We now turn to parallels with derived nouns having nominal shape.

2.2.4 THE SEMANTICS OF DERIVATIVES HOMOPHONOUS WITH NOMINALS

Considering the phrases John's brief residence in California and John's spacious residence in California, we find that the choice of adjectives forces S-interpretation in the first case and NP-interpretation in the second. The NP-interpretation, THAT IN WHICH ONE V'S, parallels the interpretations of study and dump, which we discussed in section 2.2.2.1. Similarly, the NP-interpretation of translation as THAT WHICH IS V'ED, parallels the reading given the stress-shifted derivative record.

Derived nouns homophonous with nominals fall into many of the same semantic classes that characterize other derived nouns. The following table summarizes the two major interpretations:

(191) THAT WHICH V'S: obstruction, complication, limitation, affliction, punishment, entertainment, inspiration, irritation, nourishment, compensation, replacement, illustration, interference, solution, reinforcement

THAT WHICH IS V'ED: assumption, donation, supposition, inheritance, acquisition, assignment, discovery, invention, prescription, creation, establishment, suggestion

There are other important categories. For example, the following are characterized as EVENTS: celebration, burial, election, inauguration, execution, consultation, and interrogation. Although these NP-interpretations are
generally [-Animate], they may sometimes be interpreted as [+Human]:

(192) Haynsworth was Nixon's nomination to the Supreme Court.

(193) The poet's inspiration was his beautiful wife.

(194) The applicant listed two teachers as references.

(195) Replacements were expected soon at the front.

As a final observation, we note that gerundive nominals often have derived nouns as homonyms as well:

(196) THAT WHICH V'S: wrapping, covering, trimming, flavoring, kindling, housing, roofing, padding, planking, coloring

THAT WHICH IS V'ED: hanging, etching, engraving, building, painting, printing

Again, we find an EVENT group: crowning, christening, hearing, meeting, hanging, training, teething. Parallel with the case of residence above is that of dwelling. And as we noted in section 2.1.4, there are also many gerundives meaning CAPACITY or ABSTRACT ACTIVITY, as for example, sailing, gardening, teaching, smuggling, whaling, riding, skiing, cooking, housekeeping.

2.2.5 SUMMARY

The second part of this chapter has dealt with examples from English noun morphology. We have shown that there are phonologically consistent functions which have semantically heterogeneous ranges, and that there are semantically unified functions, such as THAT WHICH V'S VN, that show diverse phonology. The facts which we have examined appear to support the notation and theoretical base which we have presupposed. The reader is referred to the appendices for further discussion.
CHAPTER THREE - COMPARISON OF THE STRUCTURED LEXICON WITH THE UNSTRUCTURED LEXICON

3.1 THE ROLE OF THE LEXICON IN GRAMMAR

In a grammar which posits an unstructured lexicon, there is very little to be said about the function of the lexicon. Within such a framework, the lexicon is merely an alphabet of formatives: lists of nouns, verbs, adjectives, etc. This formative alphabet presumably mediates between the syntax and the phonology, and performs some vague semantic function, but it is not itself an active component of grammar. [See Aspects of the Theory of Syntax, pp. 141-2]

In such a grammar, when sentences containing similar formatives are shown to be related in meaning, it is ordinarily assumed that the sentences are to be correlated syntactically by transformational derivation. The tacit assumption is that all derivation is syntactic derivation. As Chomsky comments in his paper on nominalization, "in the earliest work on transformational grammar...the correctness of the transformationalist position was taken for granted; and, in fact, there was really no alternative as the theory of grammar was formulated at that time." [p.188]

The derived nominal raises grave difficulties for a grammar with a featureless, unstructured lexicon in which all derivation is syntactic. This is so because, as Chomsky observes, the noun phrase (1) and the sentence (2) are semantically related,

(1) the enemy's destruction of the city
(2) the enemy destroyed the city

but the derivation of (1) from (2) is not easily accounted for by syntactic transformations. To deal with this problem, Chomsky formulated the lexicalist
position, involving "the extension of grammatical theory to incorporate syntactic features." [p.188]

Chomsky's alternative analysis employs syntactic features like [+N] and [+V] and an extension of the base to account for the correlation of (1) with (2). A mechanism is provided which permits the insertion of destroy under a node N, later rewriting [destroy, +N] as destruction.

It must be noted, however, that this lexicalist position does not entail significant innovation in the lexicon, which remains basically amorphous. Chomsky has proposed "as a tentative hypothesis, that a great many items appear in the lexicon with fixed selectional and strict sub-categorization features, but with a choice as to the features associated with the lexical categories noun, verb, adjective." No hierarchy of syntactic features is available within such a theory, since [destroy, +V] and [destroy, +N] are entirely equal in lexical status. The hypothesis explicitly requires that destroy be neither verb nor noun, but rather a de-categorized, floating formative, a "neutral" lexical entry. [p.190] As we shall see, this proposal has some unfortunate consequences.

3.2 LEXICAL HIERARCHY

If we assume a more sophisticated lexicon of the type briefly sketched in Chapter Two, another hypothesis becomes available for explaining the correlation of (1) and (2). The structured lexicon offers the concept of derivational function, which may be used to explain the correspondence between (1) and (2). In particular, such a theory leads us to posit a function NOMINALVN which maps verbs onto nouns. One such mapping is that of the argument destroy onto its value destructionN, which is subsequently assigned S-interpretation in the manner described in Chapter Two. Here, it is the lexicon and its
lexical rules that account for the semantic correspondence between the verb and its associated nominal.

Thus far, this may appear to be merely a notational variant of Chomsky's lexicalist position, with the semantic value NOMINAL somehow replacing the syntactic feature [+N]. It should be clear, however, that this new hypothesis differs radically from the lexicalist in that the new system imposes a definite hierarchy of syntactic categories, while the lexicalist position does not.

In the lexicalist system, "neutral" lexical items are permitted. In the new system positing functions, however, no item is neutral. Derivatives come from the ordered application of derivational functions, with noun coming from verb and verb from adjective, and so on. Each derivative has a "history", or lexical deep structure, which catalogs passage through an ordered series of syntactic categories.

In the structured lexicon, destruction and destroy do not have equivalent status. One (the former) is clearly derived from the other (the latter). To help demonstrate that this is the case, we now turn to some arguments for linear derivation. The argument pattern that we will develop supports the hierarchy which we have claimed.

3.3 THE LINEARITY OF DERIVATION

We have observed that the derivational hypothesis imposes a hierarchy, or linear order, on the application of lexical rules. Each function assigns a syntactic category to output formatives, and thus the repeated application of rules leads to successive layers of categories. This hierarchy was observed by Bloomfield:

In languages of complex morphology we can thus observe a ranking of constructions: a complex word can be
described only as though the various compounds, affixations, modifications, and so on, were added in a certain order to the basic form. Thus, in English, the word actresses consists, in the first place of actress and [-ez], just as lasses consists of lass and [-ez]; actress, in turn consists of actor and -ess, just as countess consists of count and -ess; actor finally, consists of act and [-r]. There would be no parallel for a division of actresses, say, into actor and -esses. In languages of this type, then, we can distinguish several ranks of morphologic structure. [p.222]

Implicit in the notation which we have developed are the assumptions that derivation is a linear process, and an accretive process. We now explore the first of these assumptions.

Consider the sentence:

(3) The government's irresponsibility disturbed Dr. Spock.

Using an analysis of the type employed in Chapter Two, we may conclude that this sentence is related to sentence (4):

(4) The fact that the government was irresponsible disturbed Dr. Spock.

This correlation suggests that irresponsibility is the nominal of the adjective irresponsible, giving the partial lexical entry:

(5) irresponsibility\_N: [-count], irresponsible\_A, NOMINAL

It seems natural to relate the adjective irresponsible of (4) to an underlying adjective responsible, as in sentence (6):

(6) The fact that the government was not responsible disturbed Dr. Spock.

This argues for the partial entry:

(7) irresponsible\_A: responsible\_A, \textbf{NOT}

Putting together (5) and (7), we find the lexical deep structure:

(8) irresponsibility = -ity\_\text{in-}\_\text{-}\_\text{responsible\_A,}\_A\\\_N

The structure of impossibility would be similar, with possible entered as the
adjective argument.

We note, however, the existence of the words responsibility and possibility which do not figure in the course of derivation which we have supposed. In the discussion of irresponsibility we somewhat arbitrarily assumed that the nominal is to be derived from the adjective. This is not the only assumption imaginable, however. We could have claimed that irresponsibility is derived, instead from responsibility.

At first glance, such a hypothesis seems quite plausible. We might relate (3) to sentence (9):

(9) The government's lack of responsibility disturbed Dr. Spock.

We might posit, instead, the following deep structure:

(10) irresponsibility = in- [Fity [responsibleA N]N]

Why, after all, is structure (8) preferable to structure (10)? Structure (10) would assert that the prefix in- was attached last in the derivation, while (8) claims that the nominal formation, -ityAN, was the last function to apply. Is there a principled means for choosing between these conflicting claims? Does it make a difference?

Our decision depends not so much upon the individual item as upon the structure of the total vocabulary of English. If we were to assume the lexical deep structure of (10) for irresponsibility, we would imply a partial lexical entry (11):

(11) irresponsibilityN: responsibilityN, LACK OF

The function effecting the mapping of (11) and adding the meaning LACK OF, would be phonologically represented as in-N since it would map nouns onto nouns. Such a rule appears reasonable enough until we consider the fact that we must also account for the pairs possibleA/impossibleA and responsibleA/
irresponsible. Here we would have a partial lexical entry (12):

(12) irresponsible_A: responsible_A, NOT

This entry posits another function, which would be phonologically represented as in-N.A. Let us call in-N rule X and in-A rule Y.

It happens that if we examine the English vocabulary we find that derived nominals apparently resulting from the application of rule X occur only in cases where we find related derived adjectives from rule Y. If there is no in-adjective, there can be no in-nominal. Thus, we do not find *inserenity because there is no *insere, while we do have insincerity because the adjective insincere exists. This fact strongly suggests that rule X is not independent of rule Y.

In fact, an ordering of the rules as in (8) allows the total elimination of rule X. We can derive impossible directly from possible by rule Y, and then get their respective nominals impossibility and possibility by separate applications of the nominalizing rule -ityAN. Only two rules are required, not three.

Rule X, in-N, is thus shown to be a spurious generalization. If the derivational functions are applied in the correct order, this function becomes superfluous. A grammar which excludes in-N is more economical than a grammar that includes it.

A striking example of deep structure linearity which is obscured at the surface is the pair reusable/unusable, both of which come ultimately from the verb use. They seem similar at the surface, but they can be shown to have quite different deep lexical structures:

(13) reusable = -able[re-[use_A]_V]
The adjective reusable comes from the verb reuse by application of the derivational function -able, and the verb reuse, in turn, comes from the underlying argument use via the derivational function re-. The adjective unusable, on the other hand, arises from usable by application of the function un- and the adjective usable results from the argument use after application of the function -able. Note that we could, in addition, apply the function un- to the structure (13), giving reusable. Unreusable is represented as:

\[
\text{unreusable} = \text{un-} \{ \text{able} \{ \text{use} \} \} \]

Now if it were argued, for example, that (16) is the correct structure for reusable,

\[
\text{reusable} = \text{re-} \{ \text{able} \{ \text{use} \} \}
\]

We would have to posit the particular entry:

\[
\text{reusable} : \text{usable}, \text{AGAIN}
\]

This entry implies the existence of a function Z which derives re- adjectives from other adjectives. The line of argument used against such a function is entirely similar to that employed above. We are forced to assume a function re- applying to adjectives, but we note that all re- adjectives in the English vocabulary are related causally to re- verbs. If we look carefully at the words of English, we find no adjectives unrelated to verbs which might undergo such a function. The adjectives *repregnant, *rehopeful, *reuseless do not exist, although they would be semantically acceptable in the meanings PREGNANT AGAIN, HOPEFUL AGAIN, and USELESS AGAIN. Since the function re- would be able to yield adjectival derivatives only in cases where the function re- could apply to a verb underlying the adjective, we find that the function re- cannot be independent of re-. By an argument of economy, then re- does not exist.
By the right ordering in deep structure, only the function $re^{-V}$ is required to account for the facts.

As a final example of this mode of argument, we consider the sentence:

(18) The uncrated books are in my office.

This sentence is ambiguous, meaning either (19) or (20):

(19) The books which have not (ever) been crated are in my office.

(20) The books which have (just) been uncrated are in my office.

The ambiguity of (18) receives a very simple explanation under the derivational hypothesis. The adjective *uncrated* is derivationally ambiguous, having two alternative deep structures:

(21) uncrated $= un-[-ed[crate_A]]_V^A$  
(22) uncrated $= -ed[un-[crate_A]]_V^A$

One of the adjectives has been derived through the categories $V$, $A$, $A$, while the other has passed through $V,V,A$. It may at first appear that there are only two derivational functions here, but there are actually three: $un^{-A}$, $un^{-V}$, and $ed^{-VA}$. The function $un^{-A}$ is an allofunction of the function $in^{-A}$ which we have just encountered. It yields such adjectives as unhappy, unpopular, unperturbed, unloved, unavoidable (with its doublet inevitable). The homophonous function $un^{-V}$ applies only to verbs, giving untie, unpack, unfasten, undo, unhook. In general, its semantic content is REVERSAL.

The ambiguity of sentence (18) is explained by the two deep structures (21) and (22). *Uncrated* is either the participle of the verb *uncrate* or it is the negative of the participle *crated*. This example shows that it clearly does matter in which order derivational affixes are applied. Interpretation (19) is correlated with lexical deep structure (21), and interpretation (20) with deep structure (22). We note in passing that our arguments imply the existence of a formative *ununcrated*, as in sentence (23), meaning (24):

(23) The ununcrated books are in my office.
The books which have not been uncrated are in my office. Sentence (23) implies that most of my books have been uncrated, but that some have not.

In summary, the remarks of this section are intended to demonstrate that lexical formatives have a linear deep structure, although it often does not follow left-right surface structure. The formative is not simply a disordered conglomeration of morphs. In fact, if it were, we should anticipate the possibility of variations in morpheme order within formatives. Such is not generally the case, and our theory explains this fact. What are traditionally known as "bound morphemes" can be shown to be "bound" in a particularly important way.

3.4 DERIVATION AS ACCRETION

These observations of linearity suggest that if the two lexical items destroy and destruction are functionally related, one is probably derived from the other (although logically there is also the possibility that both derive from some third argument). An additional principle must be invoked to support the assertion that destruction is derived from destroy. This is the principle of accretion, which claims that if two formatives are related by a function, that added-to is derivative. A corollary of this principle is the claim that deletion is not an operator. In general, although not in all cases, if two formatives are related, the "longer" phonologically is the derivative.

We will note in section 5.2.1 that in some cases truncation of phonological segments does occur, as for example in medicine/medicate alongside vaccine/vaccinate, where submorphemic elements have been deleted as an affix has been applied. If a full-fledged morpheme is actually deleted, however, accretion may have been violated. See section 5.2 for some problems.
By assuming that verbs serve as arguments and nominals as values of a function mapping one onto the other, we expect to encounter verbs with no nominals, but not the reverse. This is indeed the case. We note, for example, that the verb vanish has no derived nominal, although there is no phonological or semantic block, as shown by the existence of banishment from banish, and disappearance from disappear. It should be quite rare for a nominal to exist without an associated verb, however, since the only source of nominals is the function which we have posited. Similar observations hold for adjectives and their nominals. Again, our expectations are justified when we look at the vocabulary as a whole. Note that in an unstructured lexicon observations of this sort appear strictly fortuitous. The item [vanish, +V] is no more likely, in such a theory, than the item [vanish, +N].

There is a variant of the principle of accretion which can be cited in cases of zero-derivation to determine which item is underlying. The variant principle is: when the phonologies of two related formatives are equally complex, follow the evidence of analogical forms. We tacitly applied this principle in section 2.2.2 in arguing that the adjective thin underlies the verb thin, since the pair thick and thicken stand in analogy, and the adjective thick is shorter than the verb thicken. This principle argues against morphological functions requiring phonological deletion to be an operator.

3.5 THE SEMANTICS OF ZERO-DERIVED DENOMINAL VERBS AND DEVERBAL NOUNS

Perhaps the most interesting derivations involve homophonous noun-verb pairs. It is not always easy in zero-derivation to establish whether the noun is underlying or the verb. The only clue is the semantic evidence.

For example, the following noun-verb pairs seem to be underlyingly verbs:

(25)  hit, knock, smile, move, pinch, sob, glide, grasp, hiss,
push, scowl, scratch, scream, shine, slur, grin, grumble, shudder, sip, moan, sneeze, snort, struggle, yawn, growl, ride, saunter, spin, cough, shake

As nouns, none of these can name physical objects; all refer to actions or to the results of actions. Many occur as the idiomatic objects of give and make, as in give a push/shake/spin or make a dash/run/smile. Marchand has suggested that a verb underlies if the noun denotes a "single instance illustrative of the active process." [p.374].

When the noun in a homophonous pair names a physical object or substance, on the other hand, the noun is usually underlying:

(26) fish, water, ape, salt, box, slave, lecture, finger, picture, tree, mask, crate, shop, bone, robe, husk, milk, man, people, torpedo, truck, package, rivet, mother, father, police, chaperone, hand, button, book, blossom, knife, parachute, comb, hammer, saw, bus, paper, floor, roof.

In each of these cases it is impossible to define the verb without mentioning the noun. Thus, water and salt mean TO APPLY N TO, while bone and husk mean TO REMOVE N FROM. The verb dust has both meanings, as in dust a crop and dust a table. The verbs truck and bus both mean TO TRANSPORT BY N. To ape is TO IMITATE AS AN N WOULD, while slave means TO WORK AS AN N WOULD, and so on.

The various meanings of these denominal verbs are obviously highly idiosyncratic, but they are not totally arbitrary. The verb fall into definite groups, as the above remarks would indicate. Once the "missing" verb (apply, put, remove, transport) is semantically recovered, the meaning of the derived verb becomes transparent. Not just any semantic relation is permitted between noun and verb in zero-derivation. Despite their phonological coincidence, for example, there is no direct derivational link in the lexicon between the noun
handle and the verb handle, because no analogy exists with any similar pair.

It should be evident from these semantic arguments that a lexicon which is not able to rank syntactic categories in derivation is less highly valued than one which anticipates hierarchy. It should be evident that it would be wrong to enter these items in the lexicon as unlabeled "neutral" roots which are only later specified [+N] or [+V], since this would lump together the two types of derivation which we have taken pains to isolate. A structured theory of the type that we have advocated here better explains the facts of morphological derivation.
CHAPTER FOUR - COMPARISON OF THE STRUCTURED LEXICON WITH GENERATIVE SEMANTICS

4.1 INTRODUCTION

In Chapter Three we argued that the structured lexicon of Chapter Two is theoretically preferable to the unstructured theory of early lexicalism. This chapter will present empirical evidence showing that the structured lexicon is also superior to generative semantics as put forward in the work of George Lakoff, James McCawley, and others.

The facts presented in this section largely focus on problems of agentive noun formation in English. The transformationalist treatment advocated by generative semantics leads us to expect regularities that do not, in fact, occur in the data, just as the unstructured lexicon fails to predict the regularities that do. The lexicon structured by derivational functions makes just the right claims, anticipating a degree of sound-meaning correspondence in agentive nouns that falls midway between the extreme randomness inherent in an unstructured lexicon and the extreme lawfulness implied by transformational devices.

4.2 THE AGENTIVE TRANSFORMATION

In his dissertation *Irregularity in Syntax* George Lakoff develops the theoretical position characteristic of generative semantics that morphological derivation is to be handled transformationally rather than interpretively. Lakoff's approach allows him to relate nouns to cognate verbs, as in the derivation of sentence (1a) from (1b):

(1a) Harry is the ruler of Liechtenstein.

(1b) Harry rules Liechtenstein.
In Lakoff's system, the noun *ruler* is derived from the underlying sentential source containing the verb *rule* by application of an agentive transformation.

McCawley (1968) further specifies this approach by proposing prelexical transformations where the phrase the inventor of the wheel is to come from a sentence structure as follows:

\[(2)\]

\[
\begin{array}{c}
S \\
\downarrow \\
\text{x invented the wheel}
\end{array}
\quad \rightarrow 
\begin{array}{c}
\text{NP:x} \\
\downarrow \\
\text{Invent Agent} \\
\downarrow \\
\text{the wheel}
\end{array}
\]

In the course of this derivation the lexical item *inventor* is to be substituted for the structure:

\[(3)\]

\[
\begin{array}{c}
\text{Invent Agent}
\end{array}
\]

In the generative semantic system put forward by Lakoff and McCawley, *Agent* is realized not only in nouns ending in *-or* and *-er*, however. Alongside (1a) and (1b), for example, Lakoff arrays:

\[(4a)\] Harry is the king of Liechtenstein.

\[(4b)\] *Harry kings Liechtenstein.

Lakoff makes it clear that (4a) is to be derived from (4b) in the same way that (1a) is to come from (1b), although a hypothetical verb *king* is required to account for this derivation. Another set of examples to be handled by Lakoff's agentive transformation is:

\[(5a)\] John is a robber.

\[(5b)\] John is a thief.

\[(6a)\] John robs things.

\[(6b)\] *John thieves things. (compare thievery)*

Here sentences (6a) and (6b) are the putative sources of (5a) and (5b).
4.2.1 PROBLEMS WITH LAKOFF'S ANALYSIS

A number of problems immediately arise with these examples. Factually, I disagree with Lakoff's grammaticality judgments connected with rob and thieve in (6a) and (6b). In my dialect, rob takes as objects those persons or institutions which are robbed, but not that which is taken in the robbery:

(7) John robs banks.
(8) John robs little old ladies.
(9) *John robs banknotes and securities.

Thus, for my speech, (6a) is ungrammatical. So, incidentally, is
(10) *John is a robber of things.

which should be the agentive transformation of (6a) if the rule employed in (1a) and (4a) is adhered to. Interestingly, the verb steal may be substituted in (6a) and (9) to give:

(11) John steals things.
(12) John steals banknotes and securities.

There is no agentive stealer in my speech, however:

(13) *John is a stealer.

Thieve, on the other hand, is not a hypothetical verb in my dialect. It exists, but is intransitive:

(14) John thieves.
(15) John does a lot of thieving.

The theoretical problems with Lakoff's analysis are much more serious, however. He proposes that both thief and king be derived from underlying verbs by the agentive transformation, although neither noun manifests the characteristic agentive endings. This approach manages to capture the semantic generalization implicit in identical roots (correctly asserting, for example, that rob and robber are related), but it totally disregards morphological evidence and often requires
the postulation of unattested underlying formatives which have no independent justification.

In particular, Lakoff is quite unable to explain why the agent noun coming from the allegedly underlying thief should not be *thiever rather than thief. Other verbs rhyming with thief show that there is no phonological block to formatives with this shape: we find receiver and deceiver coming from verbs ending in [ivi]. If a transformation exists, why should thief not follow it fully, including morphological detail? Lakoff attempts no explanation for this fact.

Similarly, he does not explain why the noun coming from the underlying hypothetical verb king should be a zero-derivative, rather than *kinger by analogy with singer and ringer. Apparently, in Lakoff's system we must record with the underlying hypothetical verb king not only the fact that it cannot be realized at the surface, but also the fact that its agent derivative is irregular. This is a peculiar state of affairs. It would seem that the whole point of positing a hypothetical element should be a regularization of the facts, rather than the reverse.

4.2.1.1 BACK-FORMATION AND ANALOGY

In a chapter on lexical representation Lakoff remarks that, for the section now under consideration, "a number of verbs had to be listed as hypothetical items in order to account for certain derived forms of those verbs and for our intuitions about them. Many of these have actually appeared as back-formations at various times in the history of the language. A number of them were common verbs for a long period of time. Among these are to benefact, to plumb, to poetize, to purpose, to consternate, to constern, to thief, to critique, and to king." [pp. 89-90]
Here Lakoff lists under the traditional rubric of "back-formation" a number of disparate derivational processes. In discussing analogic change Bloomfield (1933) defined this term as follows: the "creation of shorter or underlying forms is called back-formation." [p.412] Lakoff's verb *plumb* is an example of back-formation in the sense Bloomfield intended, since *plumb* participates fully in the semantic and phonological analogy (16):

(16) \[ \text{paint}_v : \text{painter}_N :: \text{bake}_v : \text{baker}_N :: x_v : \text{plumber}_N \]

The verbs *poetize*, *thieve*, and *king* are clearly not back-formations in this sense, however. Although they are held by Lakoff to be "underlying forms," they do not belong in analogy (16). *Poetize*, for example, is longer than its putative derivative *poet*, and thus would violate the principle of accretion developed in Chapter Three. This is of no interest to Lakoff, however, who comments: "Let us put aside the interesting question of the relationship of the phonological forms of the words to one another and concentrate on the syntactic issues involved." [p.91] Unfortunately, to put aside this question is to ignore the central evidence.

Lakoff's method is to use whole sentences as analogical evidence, taking, for example, the existence of (5)-(6) together as proof that the noun *thief* must be the derivative of a verb *thieve*, since *thief* has the "agentive" meaning required. Using entire sentences as analogies, however, one must be careful to see that the proper variable has truly been isolated. Is it the case, for example, that a transformation is the only possible source for the "agentive" properties of the noun *thief*? Are we certain that *thief* is a derivative at all?

In fact, there is another distinctly plausible possibility, namely the reverse, that the noun *thief* is underlying and that the verb *thieve* is derived from it. This alternative course of derivation is supported by phonological,
semantic, and historical evidence. First, we find the semantic analogy:

(17) slave \(_N\) : slave \(_V\) :: thief \(_N\) : thieve \(_V\)

Here the verbs both mean TO ACT LIKE \(N\). Historically, these meanings are attested centuries later than the nouns. In its present sense, the OED cites the verb \textit{slave} first in 1719, "There's many more who slave and toil, Their living to get," while the first use of the noun is recorded for 1290. Similarly, \textit{thief} occurs in 688-95, with some attestations of \textit{thieve} in the 900's, but most only after the 1600's, as in 1627, "And there this monster sat him down to thieve." The late attestation of the verbs argues that the nouns are underlying, contrary to Lakoff's hypothesis. Second, we find the phonological analogy:

(18) house \(_N\) : house \(_V\) :: thief \(_N\) : thieve \(_V\)

The phonological pattern evident here is that when verbs come from nouns ending in a voiceless fricative, the consonant often becomes voiced. Thus, we may suspect the existence of a derivational function mapping the noun \textit{thief} onto the verb \textit{thieve}, voicing the final consonant and assigning the meaning TO ACT AS \(N\).\(^{12}\) We no longer need to explain the fact that there is no agentive -\textit{er} ending on the noun, since the verb is not taken as underlying.

4.2.1.2 THE KING CASE

Having made these observations about \textit{thief}, we now reconsider the alleged derivation of \textit{king}\(_N\) from an underlying hypothetical verb \textit{*king}. There is an analogy that at first appears to support this path of derivation, namely the zero-derivative pattern (19):

(19) cook \(_V\) ; cook \(_N\) :: x \(_V\) : king \(_N\)

where the noun means ONE WHO \(V'S\). The other nouns which are also [+Human] zero-derivatives of verbs are generally derogatory, however, as Marchand observes:
cheat, bore, flirt, gossip, sneak, snoop, spy, tease, tramp; the few which are non-derogatory are listed by Marchand as: coach, cook, guide, and judge. [p.376] King does not appear to belong in this group.

Much more significant, however, is the question as to what it means to king. If the verb merely means TO BE KING, and nothing else, what does the postulation of the hypothetical verb accomplish? In particular, what are the limits to this process? Do all human nouns come from underlying verbs? Are sentences (20) derived from the underlying (21)?

(20a) Elizabeth is the queen of England.
(20b) Charles is the prince of Wales.
(20c) Elmo is the arch-duke of Lower Slobovia.
(20d) John is the black sheep of the class.
(20e) Alice is the secretary of the department.
(20f) Arthur is the villain of the play.

(21a) *Elizabeth queens England.
(21b) *Charles princes Wales.
(21c) *Elmo arch-dukes Lower Slobovia.
(21d) *John black sheeps the class.
(21e) *Alice secretaries the department.
(21f) *Arthur villains the play.

There seems to be no end to the improbable examples that come to mind.

Another problem is that when verbs are attested which are homophonous with [+Human] nouns, they frequently have other meanings than TO BE N. For example, queen exists, but it is used only with reference to the promotion of a pawn to queen status in the game of chess, as in:

(22) John queened two pawns.

Here the verb means TO MAKE INTO N. The analogy is:
4.2.2 ADJECTIVE CASES

Lakoff also claims that adjectives may be transformed into agent nouns. His first examples of such "agent nominals" are:

(24a) She is beautiful.
(24b) He is idiotic.
(24c) John is foolish.
(25a) She is a beauty.
(25b) He is an idiot.
(25c) John is a fool.

Here examples (25) are allegedly derived from the adjectival sources in (24). We now turn to each of these cases in detail. In each instance we will argue that nouns underlie the adjectives, rather than the reverse.

To some extent Lakoff already concedes this point by remarking in parentheses: "I assume that the adjective endings -ful, -ic, -ish, are added by late spelling rules onto adjectives that have not been transformed into nouns." [p.128] The alleged lateness of spelling rules notwithstanding, it should be quite clear that Lakoff's proposal amounts functionally to the deletion of adjective suffixes to form nouns. For the grammar to know how to spell the adjectives "later", it must already store full information about actually realized endings: which adjectives take -ful, which -ic, etc. Lakoff's theory amounts to the postulation of double adjective entries, since somewhere the grammar must store both stages of every adjective, e.g., both *fool_A and foolish_A. To say that

\[(23)\] knight_N : knight_V :: queen_N : queen_V

No ready explanation is forthcoming within the framework of generative semantics for the fact that when these verbs do exist their semantic content often differs from what the agentive transformation requires.
the adjectives are both underlying and spelled later is a highly misleading way to represent morphological facts.

4.2.2.1 BEAUTIFUL/BEAUTY

Lakoff has asserted that beauty of (25a) is the "agent noun" of the adjective beautiful of (24a). But what is an "agent noun"? The great majority of adjectives do not undergo this alleged transformation. For example, there are no "agent noun" morphologically associated with the adjectives of (26):

(26) She is { ugly, nice, lazy, smart, good, happy, strong, rich, interesting}

The productivity of the beauty pattern, to which Lakoff devotes only one example, is in fact quite limited. A thorough search yields only the following potential pairings:

(27a) She is helpful.
(27b) She is a help.
(28a) She is delightful.
(28b) She is a delight.
(29a) She is wonderful.
(29b) She is a wonder.
(30a) She is disgraceful.
(30b) She is a disgrace.
(31a) She is frightful.
(31b) She is a fright.
(32a) She is successful.
(32b) She is a success.

There are many more adjectives in -ful that do not follow this pattern:

(33a) She is merciful.
(33b) *She is a mercy.
(34a) She is hopeful.
(34b) *She is a hope.
(35a) She is powerful.
(35b) *She is a power.
(36a) She is deceitful.
(36b) *She is a deceit.
(37a) She is truthful.
(37b) *She is a truth.
(38a) She is faithful.
(38b) *She is a faith.
(39a) She is dutiful.
(39b) *She is a duty.
(40a) She is skilful.
(40b) *She is a skill.
(41a) She is wrathful.
(41b) *She is a wrath.
(42a) She is wasteful.
(42b) *She is a waste.
(43a) She is hateful.
(43b) *She is a hate.
(44a) She is useful.
(44b) *She is a use.
(45a) She is graceful.
Many more unsuccessful examples could be given where the (b) cases clearly are not derived from the (a) cases. In general, -ful adjectives are derived, historically and synchronically, from nouns, rather than the reverse. They tend to mean, concretely, FULL OF N, or abstractly, CHARACTERIZED BY N.

The apparently "agentive" quality of the nouns of (27b)-(32b) is not the result of a transformation, but rather the consequence of a change of feature on underlying abstract nouns. The [+Human] use of the noun beauty appears to come from a concretization of the abstract noun, and this may be the case when the noun is not related to an adjective, as for example in:

(46) She is a disappointment.
(47) She is a blessing.
(48) She is an abomination.
(49) She is a curse.

Many abstract nouns fail to undergo this feature change, however:

(50) *She is a

| passion    |
| fear      |
| despair   |
| resentment|
| neglect   |
| doubt     |
| indiscretion |
| regret    |
| potential |

The pattern is not very productive, then, and it does not apply to strictly "agentive" [+Human] cases:

(51) Your black eye is a beauty.
John's new car
That theorem
This rose
Our situation

From the morphological evidence it appears, then, that the most plausible account for Lakoff's example is that a small set of evaluative abstract nouns...
undergoes a zero-derivation that allows them to be used in semantic contexts which are [+Concrete] and sometimes [+Human].

Lakoff observes that these nouns take real as a modifier:

(52) She is a real beauty.

He claims "that adverbs that modify verbs and adjectives are transformed into adjectives when the agent rule applies." As an instance he notes (52) and claims that it comes from (53):

(53) She is really beautiful.

This proposal raises further problems, which we cannot explore here; in general it is questionable that adverbs are the source of adjectives, rather than the reverse. Actually, Lakoff's observation is not at all the consequence of the "agent rule," but a semantic consequence of the fact that the modified nouns are evaluative. If the agent rule were the only source, we would have no explanation for the non-agentive cases:

(54) Your black eye is a real beauty.
(55) John's painting is a real disappointment.
(56) Bill's house is a real dump.
(57) Caviar is a real luxury.

In summary, then, the derivational facts are consistent with both a functional lexicalist position and a strong stand on accretion. We may continue to assume that the noun formats (which are shorter) are underlying, and the adjectives are morphologically derived from them by functions such as (-ful, CHARACTERIZED BY N)NA. Concrete uses of abstract nouns, such as Lakoff's beauty example, may be accounted for by a feature change on abstract nouns in concrete contexts. No adjectival stage is implied, as shown by sentences (46)-(49). In the revised lexicalist framework, the morphological facts receive a natural explanation without the postulation of an unproductive
agent transformation.

4.2.2.2 IDIOTIC/IDIOT

We now turn to Lakoff's second example of agent noun transformation from an allegedly adjectival source:

(58a) He is idiotic.
(58b) He is an idiot.

Here the noun idiot of (58b) is to come from the adjective idiotic of (58a). Additional evidence for this view presented by Lakoff is the behavior of the adverb utterly under transformation, so that we find:

(59a) He is utterly idiotic.
(59b) He is an utter idiot.

To evaluate Lakoff's claims, we turn to a close examination of the adjectives in -ic. There appear to be three major derivational types. First there are the adjectives like idiotic with related shorter nouns:

(60a) He is utterly vampiric.
(60b) He is an utter vampire.
(61a) He is utterly misanthropic.
(61b) He is an utter misanthrope.
(62a) He is utterly psychopathic.
(62b) He is an utter psychopath.
(63a) He is utterly fatalistic.
(63b) He is an utter fatalist.
(64a) He is utterly materialistic.
(64b) He is an utter materialist.
(65a) He is utterly idealistic.
(65b) He is an utter idealist.
(66a) He is utterly nomadic.
(66b) He is an utter nomad.
(67a) He is utterly parasitic.
(67b) He is an utter parasite.
(68a) He is utterly optimistic.
(68b) He is an utter optimist.
(69a) He is utterly pessimistic.
(69b) He is an utter pessimist.
(70a) He is utterly enthusiastic.
(70b) He is an utter enthusiast.
(71a) He is utterly diplomatic (polite).
(71b) He is an utter diplomat.
(72a) He is utterly prophetic (psychic).
(72b) He is an utter prophet.
(73a) He is utterly acrobatic (agile).
(73b) He is an utter acrobat.

Some of these adjectives and nouns sound strange with _utter_ and _utterly_, however;

(74a) ?He is utterly artistic.
(74b) ?He is an utter artist.
(75a) ?He is utterly atheistic.
(75b) ?He is an utter atheist.
(76a) ?He is utterly monopolistic.
(76b) ?He is an utter monopolist.
(77a) ?He is utterly capitalistic.
(77b) ?He is an utter capitalist.
The nouns *communist* and *journalist* definitely cannot come from adjective sources:

(78a) *He is journalistic.
(78b) He is a journalist.
(79a) *He is communistic.
(79b) He is a communist.

If the agent transformation is to delete -ic, it must also delete -al from the ending -ical, since we find:

(80a) He is utterly heretical.
(80b) He is an utter heretic.
(81a) He is utterly fanatical.
(81b) He is an utter fanatic.
(82a) He is utterly piratical.
(82b) He is an utter pirate.

The noun *critic* cannot be gotten in this way:

(83a) ?He is utterly critical.
(83b) *He is an utter critic.

*Cynical* appears to work, however:

(84a) He is utterly cynical.
(84b) He is an utter cynic.

The second type of -ic adjective shows a zero-derived "agent noun." Some take *utter* and utterly; others do not:

(85a) He is rustic.
(85b) He is a rustic.
(86a) He is agnostic.
(86b) He is an agnostic.
(87a) He is utterly eccentric.
(87b) He is an utter eccentric.
(88a) He is utterly psychic.
(88b) He is an utter psychic.
(89a) He is ascetic.
(89b) He is an ascetic.

Other adjectives of this type are: diabetic, eclectic, peripatetic, psychotic, neurotic, romantic, dyspeptic, spastic.

The third set of adjectives in -ic show no "agent noun" formation at all:
(90a) He is energetic.
(90b) *He is an energet.
(91a) He is pathetic.
(91b) *He is a pathet.

Those derived from proper nouns invariably lack such derivatives:
(92a) He is platonic.
(92b) *He is a platon.
(93a) He is socratic.
(93b) *He is a socrat.

Other examples showing no "agent noun" are: sympathetic, manic, sarcastic, terrific, messianic, miltonic, byronic. The "agent noun" of philanthropic would have to be the longer philanthropist.

For Lakoff's transformation to work, it will have to delete -ic or -al in the first cases, retain the ending in the second cases, and fail to apply in the third cases. The allegedly underlying adjectives will have to be marked appropriately.

The functional lexicalist treatment of these facts is quite natural, retaining the principle of accretion. The nouns are underlying in the first
cases, and the derived adjectives mean LIKE N, so that idiartic means LIKE AN IDIOT. In the second cases, the nouns are derived by a zero process from the adjectives, and they mean ONE WHO IS ADJ. The third cases simply have no noun realizations, or are derived from proper nouns by the rirst method, socratic meaning LIKE SOCRATES. These examples are not stunning. but it is clear that the revised lexicalist hypothesis is in no way inferior to generative semantics in treating them.

4.2.2.3 FOOLISH/FOOL

Lakoff's third example of the agent noun formation is weaker than the preceding. He claims that sentence (94)

(94) John is foolish.

is the sentential source for the noun of sentence (95)

(95) John is a fool.

When one carefully examines the morphological evidence, however, support for Lakoff's alleged transformation quickly vanishes. Again we find several sets of data.

First, we find the cases like foolish:

(97a) John is completely prudish.
(97b) John is a complete prude.
(98a) John is completely boorish.
(98b) John is a complete boor.
(99a) John is completely brutish.
(99b) John is a complete brute.
(100a) John is completely amateurish.
(100b) John is a complete amateur.
Some of the above sound peculiar with complete. In the following, the paired sentences are not synonymous:

(101a) John is childish.
(101b) John is a child.
(102a) John is boyish.
(102b) John is a boy.

The adjectives childish and boyish are often attributed to those who are not children or boys. This is the whole force of the suffix -ish, which means CHARACTERISTIC OF N. If sentences (101)-(102) were synonymous, it would be illogical to say:

(103) Grandpa is childish.
(104) John's father is boyish.

But these sentences are perfectly acceptable.

A second set of -ish nouns show that CHARACTERISTIC OF N is the derived meaning, and that the noun comes from the adjective:

(105a) John is elfish.
(105b) John is an elf.
(106a) Sarah is dwarfish.
(106b) Sarah is a dwarf.
(107a) Sarah is nymphish.
(107b) Sarah is a nymph.
(108a) John is spookish.
(108b) John is a spook.
(109a) John is oafish.
(109b) John is an oaf.
(110a) John is puckish.
(110b) ?John is a puck.
Where these are evaluative, they make take complete as a modifier:

(111) John is a complete oaf.

This is generally true of evaluative nouns, however, as we observed in the previous sections concerning utter and real; nouns do not have to have related adjectives for these modifiers to occur:

(112) John is a complete ass.
(113) John is an utter crook.
(114) John is a real yes-man.
(115) John is a total nincompoop.

A third set of -ish nouns are based on the names of animals:

(116a) John is piggish.
(116b) John is a pig.

We also find swinish, bearish, mulish, owlish, goatish, and puppyish. Note, however, that sentences (117) are not necessarily synonymous:

(117a) John is sheepish.
(117b) John is a sheep.

The adjective sheepish refers to only one characteristic generally attributed to sheep, namely their meekness.

A fourth subset of -ish adjectives are those of nationality. These do not take complete:

(118a) John is Finnish.
(118b) John is a Finn.

Like Finnish are: Jewish, Danish, Swedish, Iolish, and Turkish. We note, however, that Flemish, Irish, and English do not have shorter "agent nouns":

(119a) John is English.
(119b) *John is an Engle.

A fifth set of -ish adjectives definitely cannot undergo Lakoff's
transformations:

(120a) John is feverish.
(120b) *John is a fever.
(121a) John is stylish.
(121b) *John is a style.
(122a) John is ticklish.
(122b) *John is a tickle.
(123a) John is peevish.
(123b) *John is a peeve.

Finally, we encounter -ish adjectives derived from numerals and other adjectives with the meaning SOMEWHAT: reddish, pinkish, dullish, purplish, sixtyish, etc. These also fail to undergo Lakoff's alleged transformation.

Unlike the situation characteristic of research in syntax, where an enumeration of all the sentences in which a given transformation applies is not only difficult but theoretically impossible, in derivational morphology we can make a nearly complete list of the occurrence of a given suffix, using a rhyming dictionary. Upon examination of the data in this case, we find that "agent noun" formation by deletion of -ish from adjectives is simply not supported by the facts.

Rather, we find a state of affairs typical of the lexicon, where a set of -ish adjectives is derived from a variety of sources, some from [+Human] nouns, some from [+Animate] nouns, and some from nouns of other types (feverish) or from adjectives and numerals. All have the semantic flavor of SOMEWHAT. One can act foolish or piggish without literally being a fool or a pig.

This -ish example, like the two preceding examples, does not prove even partially productive. Lakoff's facts do not threaten the principle of accretion. No clear evidence for a transformation has been provided.
4.2.3 AGENT NOUNS IN [-ar]

Lakoff's final examples of agent noun formation are:

(124a) John kills men.
(124b) John is a killer of men.
(125a) John destroys houses.
(125b) John is a destroyer of houses.

As further evidence he cites the behavior of adverbs under the agent transformation, where the (b) examples come from (a) sources, again:

(126a) John kills men mercilessly.
(126b) John is a merciless killer of men.
(127a) John destroys houses professionally.
(127b) John is a professional destroyer of houses.

These examples of transformational derivation of agent nouns are considerably more plausible than the adjective cases which we have examined. In instances (124)-(125), Lakoff derives the longer noun from the shorter verb, allowing for the principle of accretion as we would in a functional lexicalist treatment.

The suffix [-ar], in contrast to the other suffixes which we have considered in this chapter, is generally productive. A new verb glick could readily be assigned an agent noun with the meaning(s): PERSON OR THING THAT GLICKS. Whether this agent noun is actually instantiated depends basically upon non-linguistic factors, but the morphology is clearly productive. This fact renders plausible an agent transformation, but it in no way argues against the functional lexicalist theory, which is also supported by it.

Lakoff's claim about the adverbs violates the principle of accretion and there are some syntactic exceptions to the pattern he cites:

(128a) John kills men immediately.
(128b) *John is an immediate killer of men.

(129a) John kills men electrically.

(129b) *John is an electric killer of men.

(130a) John kills men artificially.

(130b) *John is an artificial killer of men.

Other adverbs, when transformed, receive different interpretations:

(131a) John kills men curiously.

(131b) John is a curious killer of men.

(132a) John kills men separately.

(132b) John is a separate killer of men.

An interpretivist theory of adverbs along the lines of Jackendoff (1972) seems to be a better account of the facts in this case.

Here, the problems with Lakoff's analysis are not with the morphological path proposed, which coincides with that chosen in the functional treatment, but with the transformation itself. We note that many verbs which require objects must also have them in of-phrases when in the agentive form. The following agent nouns must have accompanying prepositional phrases:

(133) John is an instigator of rebellion
      an inhibitor of conversation
      an originator of the ice cream cone
      a disseminator of pornographic literature
      a portrayer of violence
      a thrower of parties
      a giver of gifts
      a respecter of persons
      a disturber of the peace
      a defacer of public monuments
      a bearer of good news

These facts are consistent with transformation, since the selectional restrictions requiring objects appears to be inherited by the noun in the process of transformation. (The lexicalist position is not in peril, since the lexical entries for (133) are simply marked as +[ ___ of NP]obligatorily.) Inconsistent with
transformation, however, is the contrary case, where many [-ər] nouns do in fact occur without of-phrases, although underlying verbs are strictly transitive:

(134a) *John investigates.
(134b) John is an investigator.
(135a) *John employs.
(135b) John is an employer.
(136a) *John illustrates.
(136b) John is an illustrator.

Some other examples of this type are collector, inspector, commander, grower, brewer, publisher. The transformationalist must find a way to delete the unnecessary objects before agent noun formation. The mechanism for this operation remains unclear. Lexicalism has no trouble with these cases, since they are treated as ordinary nouns.

A much more serious argument against the transformationalist is the non-existence of many -er nouns: *discusser, *forgetter, *assumer, *understander, *rememberer, *knower, *recognizer, *needer, *wanter, *hoper. Marchand comments that "it seems safe to state that only such verbs derive an agent substantive in -er as denote an activity which is observable either visibly or audibly... Generally, verbs that do not allow of the transformation of an active statement into a passive sentence do not derive -er substantives either. Derivatives from such verbs as belong, cost, weigh, for instance, do not exist.... There are no derivatives either from quasi copulas such as appear, become, grow, seem, turn or from the copula verb be." [pp.273-4] Marchand may be partially wrong about the visibility and audibility requirements (cf. thinker), but in general he is quite right in observing gaps in productivity.

Even when [-ər] derivatives exist, they may not be transformationally available even in very simple cases. For example, taker exists, as in the
compound census-taker, but we do not derive (137):

(137a) John takes his briefcase to work.
(137b) *John is a taker of his briefcase to work.

We find theater-goer and street-walker, but note the following:

(138a) Billy goes to school.
(138b) *Billy is a goer to school.
(139a) John walks to the grocery.
(139b) *John is a walker to the grocery.

Similarly, we find:

(140a) Martha talks on the telephone.
(140b) *Martha is a talker on the telephone.
(141a) Elizabeth speaks to her neighbors.
(141b) *Elizabeth is a speaker to her neighbors.
(142a) Mary does her laundry.
(142b) *Mary is a doer of her laundry.
(143a) Bill swears in French.
(143b) *Bill is a swearer in French.
(144a) Sam picks up the newspaper.
(144b) *Sam is a picker up of the newspaper.
(145a) George makes his bed.
(145b) *George is a maker of his bed.
(146a) Alan parts his hair.
(146b) *Alan is a parter of his hair.
(147a) John fills his gas tank.
(147b) *John is a filler of his gas tank.
(148a) The baby throws up all day.
The baby is a thrower up all day.

John watches his children.

*John is a watcher of his children.

Bill says his prayers.

*Bill is a sayer of his prayers.

John asks for more money.

*John is an asker for more money.

Arthur carries the cat.

*Arthur is a carrier of the cat.

John builds up his collection of cars.

*John is a builder up of his collection of cars.

Martha holds her baby.

*Martha is a holder of her baby.

John knocks at Martha's door.

*John is a knocker at Martha's door.

Bill moves to California.

*Bill is a mover to California.

Alice thinks that John is obnoxious.

*Alice is a thinker that John is obnoxious.

Paul believes that the moon is made of green cheese.

*Paul is a believer that the moon is made of green cheese.

John doubts that Bill is coming.

*John is a doubter that Bill is coming.

Elizabeth sees that her plan is futile.

*Elizabeth is a seer that her plan is futile.

John tells his wife the news.

*John is a teller to his wife of the news.
(162a) Bill hurt his dog.
(162b) *Bill is a hurter of his dog.
(163a) John hunts for deer.
(163b) *John is a hunter for deer.

Apparently, the agent transformation must be restricted in order to block the unacceptable sentences of (137)-(163). In general it seems that the transformation cannot work in sentences with indirect objects, verbs with particles, subject-referential pronouns in the object, or complement sentence objects. It is important to note, however, that even if all these conditions are met (and there may well be others), there is still the lexical requirement: the agent noun must exist. For example, although the dictionary lists hurter, in my dialect the word does not exist, so no sentence with hurt as main verb could be agent-transformed. This is evidence for the lexicalist view.

The revised lexicalist position is undisturbed by the ungrammaticality of the transforms (137)-(163). As we have observed, according to the lexicalist hypothesis each agent noun must be entered separately in the lexicon. Some nouns, like McCawley's inventor are fully lexicalized derivatives of underlying verbs. By "fully lexicalized" we mean that inventor may occur in those environments where invent would generally be found. The selectional restrictions are essentially the same:\textsuperscript{13}

(164a) John invents gizmos.
(164b) John is an inventor of gizmos.
(165a) *Prosperity invents gizmos.
(165b) *Prosperity is an inventor of gizmos.
(166a) *John invents prosperity.
(166b) *John is an inventor of prosperity.
(167a) John invents fairy stories.
(167b) John is an inventor of fairy stories.
(168a) *John invents Richard Nixon.
(168b) *John is an inventor of Richard Nixon.

In addition to the fully lexicalized derivation, there is an entry in the lexicon:

(169) inventor$^N_1$ : invent$_V$, PROFESSION

This entry, with its additional semantic information, allows inventor to occur without object in a sentence like (170):

(170) Bill is a carpenter and Tom is a blacksmith and John is an inventor.

Other nouns may be only partially lexicalized. In particular, the PROFESSION entry may not exist. For example, holder is not fully lexicalized. It may occur as the agent derivative of hold in the sense TO OWN OR POSSESS. We will call this verb hold$^X$. Thus, we find the entry:

(171) holder$^N_1$ : hold$_X$

From this entry we find derivatives like:

(172a) Tom holds a box at the opera.
(172b) Tom is the holder of a box at the opera.
(172c) Tom is an opera box holder.
(173a) Tom holds a winning lottery ticket.
(173b) Tom is the holder of a winning lottery ticket.
(173c) Tom is a winning lottery ticket holder.

The agent noun holder is also lexicalized for hold in the sense TO SERVE AS A RECEPTACLE FOR. We will call this verb hold$^Y$. We will find the lexical entry:
And we encounter derivatives like:

(175a) This bracket holds the garbage can.

(175b) This bracket is the holder of the garbage can.

(175c) This bracket is the garbage can holder.

(176) Please put the candle holder on the table.

(177) Martha made me a new pot holder.

In the meaning hold, [+Human] nouns may not be subjects, so this use of holder is naturally [-Animate]. A third meaning of held, hold, is required to account for its occurrence in (178):

(178) Martha holds her baby.

The verb hold is not lexicalized for holder, so we do not find the sentence:

(179) *Martha is a holder of her baby.

Similarly, the noun speaker is lexicalized only for the verb speak meaning TO KNOW A LANGUAGE, so that we find:

(180a) Elizabeth speaks Spanish.

(180b) Elizabeth is a speaker of Spanish.

(180c) Elizabeth is a Spanish speaker.

We do not find speaker lexicalized for the verb speak meaning TO CONVERSE WITH, however, so the sentence

(181) *Elizabeth is a speaker to her neighbors.

is not interpretable. Note, however, that speaker is lexicalized for PROFESSION, so that we find:

(182) Emma Goldman was a popular speaker.

A problem arises with walker and talker. These are not fully lexicalized either, since we ordinarily do not find:
(183) *John is a walker.
(184) *John is a talker.

although for some speakers these are variants of:

(185) John is quite a walker.
(186) John is quite a talker.

Adverbs make (183) and (184) acceptable, since we do find:

(187) John is a fast walker.
(188) John is a slow talker.

The only explanation available appears to be that agent nouns applied to humans generally denote quantities, propensities, and professions. Walker and talker are too obviously human to be helpful information. All people walk and talk. In fact, (183) and (184) become imaginable in the case where John is a baby whose development is being discussed.

The lexicalist is able to explain the fact that embedded sentence complements are blocked in the alleged agent transformation. The sentence (189)

(189) *Alice is a thinker that John is obnoxious.

is ungrammatical for the same reason that the following is:

(190) *Alice is a person that John is obnoxious.

Human nouns cannot be followed by unreduced that-clauses in surface structure. Thinker is inserted at the same level as person and it behaves similarly.

Another observation favoring the lexicalist position is the fact that verbs which are zero-derivatives of nouns do not show agent nouns in [-ər]:

(191a) John captains the ship.
(191b) *John is the captainer of the ship.
(192a) John pilots the airplane.
(192b) *John is the piloter of the airplane.
(193a) John hosts the party.
(193b) John is the hoster of the party.

The -er nouns do not occur because captain, pilot, and host already incorporate the semantic material of AGENT. The transformationalist has no explanation for their non-occurrence.

We note that when a verb is derived from a non-human noun such as milk, the agentive noun in [-r] does exist, namely milker. This derivative has three meanings, referring (1) to the person who milks, (2) to the machine used in milking, and (3) to the cow which is milkable.

These observations bring us to the most complicated argument in favor of the lexicalist position. Lakoff and McCawley do not mention the fact, which we have just observed, that many non-human agent nouns are derived by [-r].

We find the following objects and devices:

(194) buzzer, vaporizer, dryer, mixer, freezer, tranquillizer, (orange) squeezer, computer, transformer, transmitter, harvester, scooter, heater, bomber, racer, tracer, tracker, extinguisher, pacifier, skimmer, scraper, fastener, moistener, steamer, stroller, bumper, incubator, dessicator, indicator, oscillator, escalator, ventilator, recorder, calculator, regulator, insulator, detonator, alternator, separator, vibrator, refrigerator, accelerator, generator, incinerator, perforator, demonstrator, commutator, elevator, refractor, extractor, deflector, reflector, carburetor, connector, erector, detector, conductor, monitor, fertilizer.

The generative semanticists must explain the fact that these nouns will have to be attached to trees somehow different from structure (195)
Invent Agent

in order to handle words like generator. Somehow the semantic material DEVICE or OBJECT must occur in the tree.

But we now observe the important fact that there is an allofunction of [-gr], namely [-ant]. It occurs in the following [+Human] agent nouns:

(196) claimant, applicant, assistant, supplicant, informant, participant, occupant, migrant, entrant, inhabitant, consultant, adherent, aspirant, combatant, resident, registrant, celebrant, complainant.

What is striking, however, is that this allofunction also produces a set of non-human agents (largely liquid or gaseous):

(197) irritant, precipitant, stimulant, solvent, lubricant, deodorant, pollutant, repellant, coolant, intoxicant, refrigerant, propellant

The revised lexicalist view explains the similar behaviors of the suffixes [-gr] and [-ant] by noting that both functions realize the same underlying semantic material, AGENT, which is in turn split into [+Human] and [-Animate]. In some cases, both meanings occur: racer, bomber, stroller, destroyer, calculator, demonstrator, conductor, monitor.\(^\text{15}\)

The transformationalist cannot explain why two different types of tree structure should regularly show the same morphological shapes upon lexical insertion. The transformationalist does not lead us to anticipate two endings used in both ways; it might just as well be four endings, or three, or five.

For the lexicalist, the actually occurring case is quite naturally a consequence of the theory of allofunction, put forward in section 2.1.3.1.
Observe finally that the lexicalist is able to explain fairly naturally the existence of many underived [+Human] nouns that do not undergo the alleged transformation:

\begin{equation}
\text{penitent, belligerent, exponent, insurgent, savant, adjutant, militant, vagrant, lieutenant, mendicant, merchant, descendent, tenant, constituent, coroner, foreigner, southerner, northerner, easterner, westerner, Vermonter, New Yorker, tutor, bachelor, tailor, debtor, creditor, ancestor, proprietor, victor, warrior, teamster, spinster, punster, chorister, treasurer, seafarer, sorcerer, forester, docker, author, voyager, lowlander, islander, inlander, outfielder}
\end{equation}

Here the operators [-\textit{er}] and [-\textit{ant}] do not effect actual derivations from verbs, but they still express the [+Human] element of AGENT. The transformationalist has no explanation for the common meanings of (198), without positing underlying verbs that have little plausibility.

4.3 SUMMARY

This chapter has argued that the functional lexicalist theory developed in Chapter Two is superior to generative semantics in accounting for the facts of agent noun derivation. The first sections were devoted to dismissing three of Lakoff's examples as unsupported by morphological evidence when the vocabulary as a whole is examined. The last section details the syntactic and semantic problems inherent in a transformational treatment of [-\textit{\textit{er}}] derivatives and presents evidence supporting a functional solution.

The reader is referred to Appendix D, -\textit{ED} AND -\textit{LESS} NA NA, for more arguments of this type favoring revised lexicalism over generative semantics.
CHAPTER FIVE - QUESTIONS RAISED BY THE STRUCTURED LEXICON

5.1 INTRODUCTION

A number of questions arise within the theoretical framework of the structured lexicon. This chapter deals with some of these questions, proposing tentative answers in some cases and indicating possibilities for future research in others.

First, we consider the principle of accretion and the problems it raises for a consistent morphological description. Next, we turn to a discussion of the bearing of semantic evidence upon morphology. In particular, we examine the evidence required to establish phonological representations with a structured lexical theory. This question leads to a distinction between major and minor categories in derivation and an overall look at derivational patterns. The chapter closes with some speculations about adjective types and the interpretation of nominal phrases.

With its emphasis upon functional correlation of sound pattern with meaning, the structured lexicon implies a theoretical approach that tends to solve individual morphological problems on a maximally general basis. The structured lexicon itself is based on the assumption that the whole of a vocabulary is affected by the functioning of a part. This chapter works out in detail a few problems requiring this integral view.

5.2 PROBLEMS WITH ACCRETION

Inherent in the notation which we have developed is the assumption that morphological derivation is an essentially accretive process, the successive
incorporation of element after element into formative structure. In Chapter Three we briefly discussed the principle of accretion, which claims that if two formatives are related by a function, the one added to phonologically is derived. This principle basically excludes deletion as a functional operator. The exclusion of deletion implies that, with the exception of zero-derivation, every derivational function leaves a phonological trace behind. Derivation is almost, but not quite, recoverable from surface evidence, except in cases of total suppletion.

There are cases, however, where it is difficult to maintain this principle. In German, for example, we find the abstract nouns Ruhe/Unruhe and Geduld/Ungeduld alongside the adjectives ruhig, "quiet"/unruhig, "unquiet" and geduldig, "patient"/ungeduldig, "impatient". On the one hand it seems best to consider the abstract nouns underlying, the adjectives being derived from them by the derivational function -ig. Such a step, however, requires that a negative prefix be available to apply directly to nouns, a derivational un- which, in German as in English, fails to be independent of the derivational function unA, since the former cannot apply to a noun unless the noun yields a derivative adjective to which unA could apply.\textsuperscript{16} We must have the function unA for those adjectives which do not come from abstract nouns, e.g., denkbar "imaginable"/undenkbar "unimaginable".

If we assume, however, that Geduld/Ungeduld are derived from underlying adjectives, we must posit a function which deletes the adjective suffix -ig, abandoning the principle of accretion. In English we find a similar problem. The adjective happy has the derivative nominal happiness, suggesting that abstract nouns should come from underlying adjectives; unhappy/unhappiness supports this hypothesis. We find other cases, however, where the abstract
nouns is shorter than the adjective which should be its source, e.g., joyful/joy, beautiful/beauty, angry/anger, hungry/hunger. In some cases the abstract noun has a longer doublet: joyfulness, angriness. Entirely equivalent problems arise in Swedish where we have the abstract nouns behag/obehag alongside the longer adjectives behaglig "pleasant" and obehaglig "unpleasant", where o-A is the Swedish function equivalent to the function un-A of English and German, and -lig is the adjectival ending. Perhaps it is wrong to suppose that derivation will go in only one direction. Alongside the adjective/abstract N cases represented by happy/happiness with adjective underlying and joy/joyful with noun underlying, we find agent/verb cases, such as assassin/assassinate where the noun is clearly historically and synchronically underlying and kill/killer, where the verb is underlying. Thief/thieve could follow either pattern (but see section 4.2.1.1.)

It may be that deletion is allowed as an operator when a function is terminal. A terminal function is one the members of whose range may not serve as the arguments of another function. The Ungeduld and obehag cases seem to follow this pattern if derived from adjectives by deletion, but we have argued elsewhere (4.2.2.1) that beauty undergoes a zero-function to become [+Human], thus violating the suggestion that deletion is terminal if beautiful is taken as underlying. This question needs more research.

We have argued, primarily in Chapter Three, that syntactic category should not be viewed simply as a "feature" which is independently specified for lexical items. We have claimed for example, that although the formative quiet is a verb, a noun, and an adjective, it is only the adjective which is underlying. Zero-derivations are also accretive in structure.
For the sake of argument, let us temporarily assume the free-floating feature specification of unstructured lexicalism. We will have [quiet, +A], [quiet, +V] and [quiet, +N]. Similarly, we will find [tame, +A] and [tame, +V], [dry, +A], [dry, +V], [blind, +A] and [blind, +V]. We observe that the verbal entries have participles which are used adjectivally: quieted horses, tamed lions, dried beans, blinded rats. None of these is synonymous with the underlying adjectives: quiet horses, tame lions, dry beans, blind rats.

We find that the unstructured feature system has no way to distinguish dry from dried, since both are presumably represented as [dry, +A]. In particular, the unstructured feature system cannot express the fact that dried has both verbal and adjectival character. It is verbal, for example, in that it cannot be modified by very or extremely, although ordinary adjectives can: very dry beans, *very dried beans. We might seek to account for these facts by representing dried as [dry, +A, +V], with two features. To do this is almost tantamount to admitting that we need a hierarchical feature-specification, however. Note further that dryness would be specified as [dry, +N]. But dryness has the adjectival feature that it can be modified by extreme, suggesting the representation [dry, +A, +N]. Within the unstructured system, there is now no reason to exclude *driedness, which would be [dry, +A, +V, +N]; its non-occurrence is simply an arbitrary fact.

In the hierarchical system imposed by derivational functions, on the other hand, we can venture an explanation for the non-existence of *driedness. The deep structure of dried is -ed[0[dry, +A, +V]]. We observe that the function which yields participial adjectives is a terminal function. Once it has applied, no further derivations can be undergone. Thus, *driedness is cut because dried is a terminal derivative. A few similarly prohibited nouns are
There are some apparent counter-examples to the generalization that \(-ed_{VA}\) is a terminal function. We find: preparedness, ruggedness, fixedness (meaning STEADINESS), jaggedness, raggedness, wretchedness, wickedness, learnedness, blessedness, indebtedness, affectedness, conceitedness, disinterestedness, worriedness, pigheadedness. Examining these examples more closely, however, we find that underlying the \(-ness\) forms are "true" adjectives that can be modified by very and extremely, not verbs. The function \(-ed_{VA}\) has not been applied to them, so they are not terminal.

Other terminal functions appear to be \(-ly_{AAdv}\) and the various forms of \(NOMINAL_{VN}\) and \(NOMINAL_{AN}\). The function \(-ing_{VA}\) appears to be partially terminal; it feeds only into the adverb-forming function in \(-ly\): frighteningly, disturbingly. There are no \(-ness\) nominals for deverbal \(-ing\) adjectives, although the latter do take very and extremely: very frightening/ *frighteningness, extremely surprising/*surprisingness. Willingness is not a counter-example, because the adjective willing is not synchronically derived from the verb will.

The suffix \(-ity\) generally yields de-adjectival nominals, as in superior/superiority, rare/rarity, sane/sanity, peculiar/peculiarity. How are we to account for the apparently deverbal derivations of depravity (from deprave?) and deformity (from deform?)? Is there also a homophonous function \(-ity_{VN}\)?

An investigation into semantics discloses the correct solution. Depravity is the state of being depraved and deformity is the state of being deformed. Semantically, there is an adjectival stage between the verb and the nominals. It appears that the correct deep-structure representing depravity is thus
thus \(-\text{ity}[\emptyset[\text{deprave}_v]_A)_N\) and \textit{deformity} is represented as the structure \(-\text{ity}[\emptyset[\text{deform}_v]_A)_N\). But note that the inner adjectives cannot be realized similarly at the surface, where they are \textit{depraved} and \textit{deformed}. The verbs seem to be causatives of these underlying adjectives, but such treatment would violate the principle of accretion. The optimal solution is unclear.

It is interesting to consider in this connection the phonologically similar verbs \textit{deprive} and \textit{deprave}. The former has the nominal \textit{deprivation}, while the latter has the associated nominal \textit{depravity}, as we have just observed. \textit{Depravity} is a de-adjectival nominal, as shown by the following sentences and its paraphrase:

(1) The children's depravity was evident.
(2) The fact that the children were depraved was evident.

Similarly, we have:

(3) The children's deprivation was evident.
(4) The fact that the children were deprived was evident.

Now as the foregoing paragraph has argued, \textit{depravity} comes from a very only indirectly, if at all. Thus, it is not surprising that it cannot serve as a deverbal nominal, while \textit{deprivation} can:

(5) *John's depravity of the children was despicable.
(6) John's deprivation of the children was despicable.

(Webster's Third International lists \textit{depravation}, which would probably occur in (5) for those who have it.)

Nominals in \textit{-tion} are sometimes ambiguous between deverbal and de-adjectival interpretation, but nominals in \textit{-ity} are strictly de-adjectival. Further evidence for this generalization is provided by \textit{deform/deformity/deformation}, where the second formative may not be a deverbal nominal:
It may be de-adjectival, however:

(9) Mark's deformity saddened his mother.

(10) The fact that Mark was deformed saddened his mother.

These observations argue once again that the unstructured lexicon is inadequate observationally. If lexical items are unspecified in the lexicon as to syntactic category, acquiring features in a non-hierarchical manner, both deformity and deformation would presumably correspond to the underlying lexical item [deform, +N]. A syntactic feature theory that makes no provision for course of derivation is unable to state that deformity comes from a verb via an adjective, while deformation is derived directly. Accordingly, there is no way within such a feature system to explain the syntactic difference between the two nominals. By positing an adjectival stage in the linear derivation of deformity we explain these facts, although the problems with accretion remain.

Further research may show that deletion operations are required in morphology. [See the next section.] For the moment, however, it seems essential to adhere as closely as possible to the principle of accretion, since it leads us to respect the phonological evidence, often the only sure evidence available.

It is important to note, finally, that if a fuller theory of semantic representation were available, a semantic correlate of the principle of accretion could also be applied: if two formatives are related by a function, the simpler semantically is underlying. We used this principle tacitly in arguing for certain patterns of zero-derivation in section 3.5, in fact. It
is relatively easy to define the verb water in terms of the noun water, as TO APPLY WATER TO, for example, but it is quite impossible to define the noun in terms of the verb. The semantic principle of accretion would claim that when the two items are fully represented semantically, water must be taken as underlying water, since the representation of the noun is simpler.17

5.2.1 TRUNCATION RULES AND THE PRINCIPLE OF ACCRETION

In his thesis, Word Structure, Mark Aronoff posits truncation rules to delete a "designated stem-final morpheme before a designated suffix." [p.188]. According to Aronoff [p.189], "a truncation rule deletes a morpheme which is internal to an affix in the following manner:"

(11) $[\text{root}+A]_{x}+B_{y}$

1 2 3

$\rightarrow$

1 0 3

Aronoff goes on to say that "truncation rules are necessary within our theory simply because without them we often find cases of regularly derived words, semantically transparent, formed with affixes which we know to be alive and regular in their operation, which on the surface, do not appear to have been derived from words." [p.189]

Aronoff's first example is the suffix -ee of employ/employee and pay/payee. He observes that verbs of the form nominate and evacuate have derivatives nominee and evacuee. "Here the suffix ee does not appear attached to any verb, but rather to the root of that verb, which can be
obtained by deleting its last morpheme." [p.190]

The question arises, however, whether -ate in this case really is a morpheme. The ending -ate appears on many verbs which are not synchronically derived: exaggerate, agglutinate, deteriorate, delicate, confiscate. There seems to be no reason to separate suffix and root in these instances; the words should be entered whole in the lexicon. The ending -ate conveys the information that these formatives are verbs, but it has no other significance, and the items must be marked [+V] in any case. Under the circumstances, are we justified in calling -ate a morpheme?

There are instances where -ate clearly is a morpheme—where it serves, in fact, as the operator of a function. The function -ate\_NV has the meanings TO ADD N TO, TO SUPPLY WITH N: air\_N/aerate\_V, chlorine\_N/chlorinate\_V, fluoride\_N/floridate\_V, medicine\_N/medicinate\_V, hyphen\_N/hyphenate\_V, orchestra\_N/orchestrate\_V, vaccine\_N/vaccinate\_V. Some other instances are allied with these, though not so obviously. Hydrate and dehydrate come by -ate\_NV if we posit the variant hydr for water. Populate is related to the noun people, though its meaning is broader than its derivational source would indicate: a tenement may be populated with rats. Paginate means TO SUPPLY WITH PAGE NUMBERS, not simply with pages. These idiosyncratic shades of meaning must be recorded with the verbs in the lexicon, since the function -ate\_NV does not provide them.

Another case where -ate is a morpheme, and a function, is its use to derive verbs from adjectives, often in the meaning TO MAKE A, TO RENDER A. Thus, we find valid\_A/validate\_V, authentic\_A/authenticate\_V, liquid\_A/liquidate\_V, granular\_A/granulate\_V. Vacate\_V seems to be functionally derived from
vacant\_A; here the -nt would have to be truncated. Similar\_A appears to yield both assimilate\_V and simulate\_V, each formed with specific semantic material. Emasculate\_V is derived from masculine\_A, with the prefix e- in this case providing the negative semantic reading.

The existence of functions with operator -ate does not make -ate a morpheme in all of its occurrences, however. Aronoff has observed some cases where the sequence -ate must not appear. There are other cases where, just as arbitrarily, -ate must be inserted. Consider, for example, adjectives in -ive. We find quality\_N/qualitative\_A, quantity\_N/quantitative\_A, faculty\_N/facultative\_A, frequency\_N (frequent)/frequentative\_A, lucre\_N/lucrative\_A. Some people say orientate for orient\_V. In these cases, the inserted -ate has no semantic content. Other forms showing the inserted affix, not coming from verbs in -ate or related nominals in -ation are: sign/signatory, command/mandatory, piliferous/depilatory, compare/comparative, vocal/vocative, conspire/conspirator.

We see, then that -ate Truncation and -ate Insertion are both required in the morphology. This fact alone has no bearing on the principle of accretion, however, which states that deletion is not a functional operator.

If nomin or evacu functioned differently as roots after -ate Truncation, we might have a counterexample to accretion. This is not the case with Aronoff's examples, however. What we would need to show a violation of the principle would be two parallel derivatives: evacuee and evacuatee with different meanings, but both coming from evacuate; this would show that deletion in the first case had produced a functional change, a semantic as well as phonological alternation.

Other instances of truncation given by Aronoff do not violate the principle
of accretion, for the same reason. He cites penetrate/penetrable to show the deletion of -ate before -able. Navigate/navigable is a similar case. But here again, -ate is not functional, so its deletion does not bear on the principle.

Aronoff's "last and most striking case [of Truncation in English]... has to do with the adverbial suffix ly and the comparative suffix +er." [p.195] There are many serious problems with Aronoff's analysis.

First, he claims that the comparative of adjectives is formed in two distinct ways:

"a) The suffix +er is attached to the adjective, as in big/bigger, small/smaller.

"b) The independent word more is placed in front of the adjective, as in more interesting."

He claims that "the choice between (a) or (b) is determined phonologically. Monosyllables and disyllables ending in y take (a) (stupider and *apter are exceptions) all other take (b). Some disyllables in y, namely those which can be analyzed as X+ly, take either (a) or (b)." He gives the following table to illustrate the various restrictions:

<table>
<thead>
<tr>
<th>(12)</th>
<th>adj</th>
<th>more adj</th>
<th>adfer</th>
</tr>
</thead>
<tbody>
<tr>
<td>big</td>
<td>*more big</td>
<td>bigger</td>
<td></td>
</tr>
<tr>
<td>fast</td>
<td>*more fast</td>
<td>faster</td>
<td></td>
</tr>
<tr>
<td>happy</td>
<td>*more happy</td>
<td>happier</td>
<td></td>
</tr>
<tr>
<td>silly</td>
<td>more silly</td>
<td>sillier</td>
<td></td>
</tr>
<tr>
<td>lovely</td>
<td>more lovely</td>
<td>lovelier</td>
<td></td>
</tr>
<tr>
<td>sprightly</td>
<td>more sprightly</td>
<td>sprightlier</td>
<td></td>
</tr>
<tr>
<td>comely</td>
<td>more comely</td>
<td>comelier</td>
<td></td>
</tr>
<tr>
<td>perverse</td>
<td>more perverse</td>
<td>??perverser</td>
<td></td>
</tr>
<tr>
<td>flagrant</td>
<td>more flagrant</td>
<td>*flagranter</td>
<td></td>
</tr>
<tr>
<td>pompous</td>
<td>more pompous</td>
<td>*pompouser</td>
<td></td>
</tr>
</tbody>
</table>
The conditioning environment for the comparative is not, in fact, so unique as Aronoff asserts. Quirk and Greenbaum observe that "common disyllabic adjectives that can take inflected forms are those ending in an unstressed vowel, syllabic /l/ or /ə(r)/:

1. -y: funny, noisy, wealthy, friendly
2. -ow: hollow, narrow, shallow
3. -le: gentle, feeble, noble
4. -er, -ure: clever, mature, obscure

Common adjectives outside these four categories that can take inflectional forms include common, handsome, polite, quiet, wicked." [p.134] Aronoff's exception, stupid, calls to mind other adjectives ending in /əd/ that inflectionally compare in my dialect: rugged, ragged, sacred, naked, rapid, solid. Thus, we see that the disyllabic adjectives which take inflectional -er are by no means restricted to -y or -ly endings, although these are well represented: homely, early, curly, courtly, beastly, costly, lovely, comely.

The data on which Aronoff bases his truncation claim for adverbs are not very solid. For my dialect, quick and soft are acceptable adverbs, as in:

13. Come quick!
14. He spoke so soft I could hardly hear him.

Stronger, on the other hand, is not a comparative adverb in my speech:

15. *I am stronger inclined to believe it.

Whatever its basis, Aronoff's claim is that "if -er was attached to disyllabic adverbs ending in y, as it is to such adjectives..., then we would expect the forms *stronglier, *quicklier, *softlier, which are not only non-current, but impossible. The simplest and most elegant solution to the problem
is to have a rule of truncation which operates only on the class of adverbs in question.

(16) \textbf{Adverb} +er truncation:

\[ C_0 V C_0 + \text{ly} + \text{er}_\text{Adv} \]

\[ 1 \quad 2 \quad 3 \quad \longrightarrow \]

\[ 1 \quad 0 \quad 3 \]

By using the truncation rule (16), ...we allow ourselves to state exactly the same conditions on the distribution of +er and more for adverbs and adjectives. The only difference between the two classes is the operation of rule (16) in the former, though not in the latter." [pp.196-7]

But what is the evidence that -er was ever applied to adverbs ending in -ly? The Adverb +er Truncation Rule seems to amount to a statement that -er never occurs with -ly in adverbs. Aronoff notes in passing that "truncated" comparative adverbs may not occur before adjectives: more deeply philosophical, *deeper philosophical. This is so, despite the fact that these forms occur in other contexts:

(17) John dived deeper.

(18) John dived more deeply.

It appears that -er forms of the adverb occur only in those places where an adverb \textbf{not} ending in -ly occurs:

(19) John dived deep.

Aronoff's grammatical judgments, excluding(20) and (21),

(20) He ran quick.

(21) He spoke soft.

prevent him from recognizing this fundamental fact, since he cannot relate these to:
(22) He ran quicker.
(23) He spoke softer.

Aronoff rejects what seems to be the more promising solution: "If we delete before we do the comparative rule [i.e., take the simple adjective form as underlying], what is the category of the item we form the comparative from? If from softly we go through soft to softer, is this soft an adjective as it should be if the ly rule is to have any validity? But if it is an adjective, then do we form the comparative of an adverb in these cases from an adjective?" [p.197]

This suggestion, that the comparative of the inflected adverb is related to the comparative of an adjective, is not contradicted by the data. Quirk and Greenbaum, for example, point out that "for a small number of adverbs the inflected forms used for comparison are the same as those for adjectives: well/better/best, badly/worse/worst.... Adverbs that are identical in form with adjectives take inflections, following the same spelling and phonetic rules as for adjectives, eg: early, late, hard, slow, fast, quick, long. Soon, which has no corresponding adjective, is frequently used in the comparative (sooner), but is not common in the superlative (soonest)." [p.135]

And so we have the generalization that if an adverb not ending in -ly may occur in a given context, then a comparative in -er may also occur. We also find the converse generalization: No -er comparative adverb may occur if the simple adverb without -ly does not occur. Note that for these purposes, early is not analyzed as ending in adverbial -ly:
(24) John came early.
(25) John came earlier than Bill.
(26) *John returned rapid.
(27) *John returned rapider than Bill.
(28) This trolley car is rapider than that one.
(29) *Alice answered stupid.
(30) *Alice answered stupider than Sarah.
(31) Alice's answer was stupider than Sarah's.

The nonoccurrence of -er forms before adjectives receives a natural explanation within this framework, since the simple forms do not occur because they would be confused with adjectives. Phrase (32) is not ambiguous, since deep must be an adjective:

(32) deep philosophical considerations.

It contrasts with the -ly form in (33):

(33) deeply philosophical considerations.

Accordingly, the inflected comparative adverb may not occur in preadjectival position, by the generalization cited in the preceding paragraph. Phrase (34) does occur,

(34) deeper philosophical considerations

but it is read with deeper as an adjective parallel with philosophical, rather than as an adverb on the adjective. The adverbial case can only be gotten periphrastically:

(35) more deeply philosophical considerations.

With participial idioms we get comparative inflected forms of the adverb:

(36) the softer-spoken individual
These follow from the use of non-ly forms in the uncompared cases:

(43) the soft-spoken individual
(44) ?the softly-spoken individual
(45) the hard-hit nation
(46) *the hardly hit nation

In general, we may say that most adverbs are compared periphrastically with more and most. Exceptions are those adverbs which are not derived from adjectives by -ly. These are zero-derived adverbs like soft and hard and underived adverbs like soon. The latter are compared like short adjectives, using -er and -est. ¹⁸

We find no evidence supporting the application of -er to -ly adverbs. This fact supports the claim, in the previous section, that -ly is a terminal function. So far the cases cited by Aronoff do not threaten the principle of accretion.

Note that we have not argued that no deletion occurs in the morphology. Truncation, so long as it occurs at a submorphemic level, does not contradict the accretive principle. Aronoff gives a very interesting example of the need for truncation in Russian. He observes that verbs derived from bez ("without") + N via an intermediate adjectival stage lose the adjectival suffix n. The verb obezumeť' ("to make crazy or mindless") is derived from
bez umě ("without mind") by an adjective step, bezděnnýj. The adjectival suffix does not appear in the verb, hence, according to Aronoff, truncation applies. But note that the stress pattern of the adjectival stage is retained. There are still phonological traces of the adjectival function. If all evidence of the adjectival stage had been erased, we might indeed have a counter-example in this Russian case; but we can posit a Truncation rule for n and still retain the notion of accretion, since the deleted suffix is only one of the phonological effects of adjective formation. It is difficult to say for sure what is going on here, but the principle of accretion does not seem challenged by the data.

5.3 PROBLEMS WITH UNDERLYING REPRESENTATIONS

The morphological approach implicit in the structured lexicon bears upon the practice of phonology. The overall goal of grammar is the systematic correlation of sound with meaning. Clearly, a phonology which generates the entire set of formatives, but fails to make the syntactic and semantic connections that we have observed, serves little purpose. An optimal phonology will have a solid semantic basis.

To make this statement is not to solve individual problems, however. In his work on contemporary French, Schane (1968) has asserted, for example, that soir/serein/serenade form a related set with the same underlying first syllable. [pp.25,45] No semantic argument is presented to defend this selection. It is not at all obvious, however, that speakers will relate "evening," "serene," and "serenade" to one another. Elsewhere, Schane claims that pastel and pâte, "pastel" and "paste, dough" are related, in order to argue for past as underlying the latter. [p.55] But what is the
evidence that speakers actually relate these formatives?

One way to argue against the pairs paste/pastel and serene/serenade in English is to observe that there are no analogical patterns, either phonological or semantic, to defend these pairings although both have historical basis. If another pair, regardless of meaning, showed the phonological pattern of [peyst]/[pæstəl], or if another pair, regardless of shape, showed the semantic pattern of MOOD/TYPETM OR MUSIC, our decision might be different, since a derivational function, however limited, would exist in each case.

A footnote from Sapir is pertinent:

One must be careful not to be misled by structural features which are mere survivals of an older stage, which have no productive life and do not enter into the unconscious patterning of the language. All languages are littered with such petrified bodies. The English -ster of spinster and Webster is an old agentive suffix, but as far as the feeling of the present English-speaking generation is concerned, it cannot be said to really exist at all; spinster and Webster have been completely disconnected from the etymological group of spin and weave (web). Similarly, there are hosts of related words in Chinese which differ in the initial consonant, the vowel, the tone, or in the presence or absence of a final consonant. Even where the Chinaman feels the etymological relationship, as in certain cases he can hardly help doing, he can assign no particular function to the phonetic variation as such. Hence it forms no live feature of the language-mechanism and must be ignored in defining the general form of the language. The caution is all the more necessary, as it is precisely the foreigner [or linguist -- RR], who approaches a new language with a certain prying inquisitiveness, that is most apt to see life in vestigial features which the native is either completely unaware of or feels merely as dead form.

[Language, fn 22, p.140]

An etymological relationship dies when the speaker "can assign no particular function to the phonetic variation as such," at the moment when meaning and form cease to be correlated. If the phonology is not semantically constrained
we quickly lose the distinction between synchrony and diachrony. Without semantic constraints, any two vaguely related formatives left by history become evidence for derivation. In fact, any formative set that strikes the fancy of the investigator can be introduced as evidence.

As such an example, consider the pairs thumb/thimble and crumb/crumble.\(^{19}\) If these pairs are accepted as formative sets, we have unimpeachable evidence for underlying final /mb/ in English. Once the validity of the formative set is acknowledged, the conclusion is inevitable. The criterion of semantic relatedness allows rejection of these pairs as formative sets, however. Thimble\(_N\) and crumble\(_V\) are of different syntactic categories, which suggests that there is no evidence for a derivational function with operator [-el]. The semantic relation thumb\(_N\) : thimble\(_N\) cannot be projected onto any other nouns; the connection between thumb and thimble is no longer evident to speakers (since the thimble is not worn on the thumb). Similarly, with crumb\(_N\) : crumble\(_V\) we find no analogical pair. The spelling crumb is deceptive, since historically /b/ was never found in the noun at all, its origin being OE cruma via ME crumme. (A good argument for underlying /mb/ could be made from bomb and the nominal bombardment, however.)

Chomsky and Halle discuss a more interesting example that raises the issues we have been examining: "Consider the word righteous, which is clearly derived from right." [Chomsky and Halle (1968, p.233] The consequence of the alleged derivation is the claim that English requires an underlying velar spirant, a claim of some substance.

In evaluating the claim and the phonology that follows from it, we must first observe that it is not clear whether Chomsky and Halle intend right\(_A\) or right\(_N\) as the putative source for righteous. From a functional point of view it clearly matters. A look at the historical facts is instructive.
As it happens, *righteous* is by no means optimally spelled. As Marchand remarks, there seems to have been a confusion in the sixteenth century between the French suffix *-ous* and the Germanic suffix *-rise*. For example, the spelling *pytewys* is attested for the French loan *piteous*. [Marchand, p.340] The true progenitor of *righteous* appears to have been the OE *rihtwis* (cf. modern Swedish *rättvis*). Given the pairs *courage/courageous* and *virtue/virtuous*, it appears that in modern English the function *-ous* applies to abstract nouns and yields adjectives meaning EXHIBITING N. Since *righteous* means UPRIGHT, JUST, it should be derived from a noun *right* meaning UPRIGHTNESS, JUSTICE. This would then fit the paradigm of *courage* N : *courageous* A :: *right* N : *righteous* A.

Unfortunately, however, in modern English the noun *right* has ceased to have this interpretation. Hall's dictionary lists "equity, justice, law, canon, rule" as definitions for OE *riht*; clearly the meaning is changed, since the noun now means PRIVILEGE. Of course we might choose to posit an unrealized abstract noun *right* (cf. Swedish *rätt*) with the appropriate meaning, but it would be misleading to claim that the adjective *righteous* is derivable from any actually existent formative *right*. The semantic facts do not support this step in the phonology, and the argument for underlying velar spirants is correspondingly weakened.

These remarks should not be taken as suggesting that the problem of semantics in phonology has somehow been, in principle, solved. In many cases, it is still not obvious how to value the morphological evidence. For example, in a footnote Chomsky and Halle suggest that "we might account for the position of primary stress [in *perfect* A] by deriving the adjective from the underlying verb *perfect* in the familiar way, but this would still leave unexplained the vowel reduction in the final syllable." [p.162]
Also unexplained, however, is the semantic pattern. It appears that the adjective and verb perfect /perfect are in paradigm with the zero-derivative pair complete /complete and we have argued in section 2.2.2 that the adjective is underlying, the zero-function being an allofunction of the causative -en. Here the phonological pattern and the semantic pattern appear to run in contradictory directions. The optimal solution remains unclear.

Chomsky and Halle frequently acknowledge difficulties of this sort. Discussing the examples aristocracy, telegraphy, synonymy, economy, galaxy, industry, and melody, they remark "that many of these examples do not justify the assignment of any special status to -y." [p.130] It seems probable that galaxy and melody are morphologically underived forms, in some suitable representation underlying other derivatives such as galactic, melodic, and melodious. Telegraphy is related to telegraph, but no clear analogies present themselves, although photography:photograph is close. Aristocracy, synonymy, economy, and industry can be nominals, however; they are plausible candidates for derivation on the model orthodox /orthodoxy , with the function (-y, NOMINAL) :

\[(11a) \text{Mary disapproves of the orthodoxy of Bill's views.}\]
\[(11b) \text{Mary disapproves of the fact that Bill's views are orthodox.}\]
\[(12a) \text{The count questioned the aristocracy of his new neighbor.}\]
\[(12b) \text{The count questioned that his new neighbor was aristocratic.}\]
\[(13a) \text{The synonymy of the sentences surprised the linguists.}\]
\[(13b) \text{It surprised the linguists that the sentences were synonymous.}\]
\[(14a) \text{Elizabeth questions the economy of a European car.}\]
\[(14b) \text{Elizabeth questions that a European car would be economical.}\]
\[(15a) \text{The old man commented favorably on his nephew's industry.}\]
(15b) The old man commented favorably on the fact that his nephew was industrious.

If we choose to posit artificial adjectival roots for the nominal derivatives, we are able to assert that $-\gamma_{AN}$ is a nominalizing function serving as an allofunction of the more regular ($-\text{ity, NOMINAL})_A$ manifest in prolix/prolixity and complex/complexity. The nominal industry would require an underlying adjectival source *industr which could be realized at the surface only as the longer industrious. It is important to remember that we argued in section 4.2.2 against such late spelling rules, however. Artificial roots are not a generally desirable solution, since they require double listing of entries in the lexicon.

Our analysis has justified the underlying plus-boundaries assumed by Chomsky and Halle for the words economy and industry in their use as nominals. The practice of morphological division followed in Sound Patterns cannot always be supported, however. For example, if one carefully examines formatives ending in -ary and -ory it becomes clear that these suffixes consistently yield adjectives, the first applying to nouns, as in fragment/fragmentary and development/developmentary, and the second applying to verbs, as in inflame/inflamatory and ejaculate/ejaculatory. [Marchand, pp. 254, 337]

Obviously, then the nouns allegory, territory, category, memory, armory, and history are not derived by $-\text{ory}_{VA}$, since they are not adjectives, nor are the nouns apothecary, anniversary, infirmary, and secretary derivatives of $-\text{ary}_{NA}$, for the same reason. In none of these noun cases can an artificial root of the type *apothec be semantically defended. The full nouns should be entered in the lexicon as underived primitives. Similarly, certain adjectives in -ary should also be entered as primitives. Although
station /stationary phonologically parallels probation /probationary, the first set is morphologically specious, since the meaning of the adjective cannot be derived from the noun. And there is no evidence that ordinary is derived by the function -ary, since no grounds exist for assuming an underlying noun *ordin. In general, the structured lexicon leads to the postulation of boundaries only in cases where derivational functions apply. In cases where no such derivation occurs, no division is generally assumed.

It is not necessarily the case, however, that suffixes are treated independently in all cases of semantic or syntactic variation. The suffix -ive, for example, is actually two derivational functions, one forming adjectives from verbs and the other forming adjectives from nouns. Phonologically the functions may well be united. Examples of -ive are: express/expressive, destroy/destructive, construct/constructive, produce/productive, elect/elective. Examples of -ive are: instinct/instinctive, quantity/quantitative, defect/defective, authority/authoritative. The existence of two functions allows us to explain the difference between an offensive quarterback and an offensive quarterback. The first, meaning "on offense" comes from the noun offense by -ive, while the second, meaning "repulsive", comes from the verb offend by -ive. Using -ive we are able to relate expensive to expense rather than to the verb expend. This is a desirable result, since expensive and expense surely appear in vocabularies where expend does not occur.

Marchand observes in this connection that "from a structural point of view, most of the ... Latin-coined words in -ive are matched by Latin-coined substantives in -ion." [p.316] An example of this is cognitive/cognition, where there is no underlying verb at the surface. Similarly, for many speakers there is no verbal source for abrasive/abrasion, *abrade,
and percussive/percussion, *percuss. It may desirable in these cases to posit the abstract verbs to link the noun and adjective morphologically.

Whatever the decisions about underlying forms in individual cases, it should be remembered that the structured lexicon lists each formative derived. This theoretical procedure implies, in psycholinguistic terms, that although phonological and semantic generalizations may assist, rote memory plays a major role in the storage of formatives. The words pertain, sustain, obtain, attain, abstain, detain, and retain are all stressed by Chomsky and Halle using the equals ("=") boundary as "complex verbs." We observe, however, that this unification of stress patterns in no way prepares us for the disarray exhibited in the nominals: pertinence (via pertinent), sustenance, obtainment, attainment, abstinence (from drink), abstention (from voting), detention, retention. There seems to be little alternative to virtual memorization of these items.

This problem is actually quite widespread. The verbs impose and compose have "regular" nominals imposition and composition, but propose has proposal, expose has exposure, and dispose has disposal. The formatives proposition, exposition, and disposition, the apparently "regular" forms, are not deverbal nominals.

In this connection Chomsky and Halle make the following observation:

When children learn their mother tongue, they are exposed not to its grammar directly but rather to the output of this grammar as it is actualized in the utterances of the parents, and it is on the basis of these utterances that children construct the grammar of a given language. The children's grammar will contain a given phonological rule which corresponds to a historically attested change and is present in the grammar of their parents only if the grammar containing this rule is the most highly valued grammar in terms of the evaluation measure.

[Chomsky and Halle, (1968), p.251]
This remark raises a fascinating question: how does the evaluation measure determine that a rule should be discarded (not acquired)? When does it become preferable to handle cases as suppletions, rather than as phonological derivatives? When does the child know that he is confronted with Sapir's "petrified bodies"? When does he memorize rather than regularize?

It seems that one clear instance when the child will choose suppletion is when the phonological rules make false predictions by regularizing the wrong formatives as a set. Such a case might be the palatalization of underlying dentals in nominals. We find the pair contend/contention, where the noun is the derived nominal of the verb:

(16a) Mary contends that her pocket book was stolen.

(16b) Mary's contention that her pocket book was stolen disturbed Sarah.

The palatalization rule may lead the child to expect that attention and pretension will be similarly derived from the verbs attend and pretend, manifestly an incorrect conclusion:

(17a) John attended the conference.

(17b) *John's attention of the conference pleased Bill.

(18a) Sam pretended to be Santa Claus.

(18b) *Sam's pretension to be Santa Claus amused the children.

The problem is, of course, that attention and pretension were originally derived from the verbs attend and pretend at a time when they had the meanings TO FIX THE MIND UPON and TO CLAIM, ASSERT. (Compare with the French attendre/attention and prétendre/prétension.) But perhaps, as semantic exceptions, the formatives attention and pretension are no more inherently misleading than idioms like run of the mill and earmark, which now have nothing to do with mills or ears.
The problem of acquisition remains, however. Do children ever make the mistakes \textit{defend}*/\textit{defention}, \textit{depend}*/\textit{depention}, \textit{recommend}*/\textit{recomention} on the pattern \textit{ascend}/\textit{ascension}, \textit{apprehend}/\textit{apprehension}, \textit{extend}/\textit{extension}?

If children do make such mistakes, this would argue for stronger phonological rules. If they do not, the role of rote memory is increased and the fully-specified entries of the structured lexicon are correspondingly supported.

5.3.1 CONSTRAINTS ON LEXICAL RULES

An important subject for future research in derivational morphology is the general nature of lexical rules. The use of functions to cross-reference lexical items is a very powerful device; arbitrary cross-reference can relate any two entries, even \textit{dog} and \textit{cat} (or, more plausibly, \textit{pen} and \textit{pencil}).

If there are no constraints on lexical rules, we might cross-reference \textit{invent} with \textit{inventory} and \textit{require} with \textit{requisition}. (These historically cognate words no longer have any intuitive connection for speakers.) What is to constrain such pairing? What are the boundaries of possible lexical relationships?

We know that a phonological rule which changes a velar stop to a front vowel should be exceedingly expensive in the description of a natural language. Similarly, we know that a syntactic rule interchanging the third and fifth words in seven-word sentences is quite improbable. But what constitutes a "natural" rule in morphology, and what characterizes an impossible rule? What types of lexical items may be cross-referenced?

A related question is: when can two functions be considered allo-functional, and when can such a tie be ruled out? In section 2.1.3.1 we argued against relating \textit{anti-} and \textit{ante-}, and against a connection between
been of the causative and adjective forming -en. In our arguments we noted the non-complementary distribution of the former two, and the differences in syntactic class of the domain and range of the latter two. Unfortunately, not all cases are so readily decided.

A problematical case of this type is presented by the more than two hundred nouns (as listed by Walker) ending in the suffix -age. Are the various derivatives allofunctionally related?

One set of -age derivatives come from units of measure:

(46) foot/footage, yard/yardage, ton/tonnage, acre/acreage, mile/milage, volt/voltage, watt/wattage.

Another set characteristically comes from verbs, the derivative having nominal interpretation:

(47) store/storage, coin/coinage, stop/stoppage, pass/passage, pilfer/pilferage.

A third set comes from nouns with the meaning PLACE WHERE N LIVES:

(48) orphan/orphanage, hermit/hermitage, vicar/vicarage, parson/parsonage.

Also meaning PLACE, but derived from verbs are:

(49) steer/steerage, moor/moorage, anchor/anchorage.

A few of these nouns mean RESULT:

(50) wreck/wreckage, leak/leakage, break/breakage.

The following seem to show other relationships:

(51) percent/percentage, link/linkage, drain/drainage, marry/marriage, use/usage, short/shortage, rough/roughage, post/postage, cover/coverage, bag/baggage, pack/package.

Like footage in the meaning AMOUNT, are dose/dosage and lever/leverage.

Thus, we find that -age forms nouns from nouns (foot), verbs (store),
and adjectives (rough). Some subgrouping of derivative meanings is possible, but in general it is impossible to say which of the semantic allofunctions, if any, is dominant. [See 2.1.3.1]. The range of meanings possible for derivatives in this suffix seems extremely varied, if not unconstrained.

A similar example is the set of nouns ending in -ry. Both denominal and deverbal derivatives exist, and there are some de-adjectival cases.

Basically meaning PLACE (and thus apparently allofunctional with the -age of orphanage) are:

(52) nun/nunnery, cream/creamery, brew/brewery, nurse/nursery, fish/fishery, bind/bindery, dean/deanery, bake/bakery, found/foundry, launder/laundry, hatch/hatchery, tan/tannery, grocer/grocery, can/cannery, wine/winery.

In many cases the underlying meaning is PLACE OF BUSINESS, although this is not the case for nunnery.

Another set of derivatives in -ry are concrete objects:

(53) shrub/shrubbery, green/greenery, scene/scenery, fine/finery, jewel/jewelry, machine/machinery, stitch/stitchery, pot/pottery, circuit/circuitry.

Arts are represented by:

(54) archer/archery, husband/husbandry, carpenter/carpentry, chemist/chemistry, dentist/dentistry, wizard/wizardry

There are also nominals in -ry:

(55) savage/savagery, brave/bravery, ribald/ribaldry

Falling into the ARTS category are the recent coinages:

(56) weapon/weaponry, gadget/gadgetry, summit/summitry, rocket/rocketry.

Abstract states are:

(57) snob/snobbery, trick/trickery/treachery, bandit/banditry,
pedant/pedantry, slave/slavery, drudge/drudgery.

Mason/masonry and peasant/peasantry are like derivatives in -age: baron/baronage and -er/peerage.

Here again, places, objects, and abstractions are all yielded by the same noun-forming suffix, applying to nouns, verbs, and adjectives. Would it be proper to unify all these derivational processes allofunctionally? It seems that these functions are united only in that their range is the set of nouns. Allofunctional unification allows the statement of certain phonological and syntactic properties of the suffix, but it suggests a unity of meaning that simply does not exist.

Organization of the data semantically rather than phonologically would reveal even more diversity as various affixes are realized: baron/baronage, peasant/peasantry, noble/nobility, aristocrat/aristocracy, monarch/monarchy.

The theory needs to be refined further to clarify whether allofunctional relations should always involve minor variations on a major, dominant pattern, or whether the diversity of the -age and -ry cases should be accommodated in the notion of allofunction. If the latter, then further criteria will be needed to distinguish between allofunctional relations and accidental similarity.

The proper solution at this point is unclear. It is certain only that the range of possible morphological relationships is quite extensive. Universal constraints are yet to be uncovered.

5.4. MAJOR, MINOR, AND NONPARTICIPANT CATEGORIES IN DERIVATION

An overall view of English morphology suggests a distinction between participant and nonparticipant, major and minor, syntactic categories. Nouns, verbs, and adjectives are major participants, since they serve in derivational
functions both as arguments and as values. (In fact, as we shall observe, functions exist mapping each of these categories onto each of the others.) Adverbs and nominals (taking the latter as a syntactic category distinct from nouns) are minor participants in derivation, serving as values for productive functions, but not in general serving as arguments. Finally, pronouns, determiners, prepositions, conjunctions, and interjections are basically nonparticipant in derivation, constituting a rather fixed and unproductive lexical group.

The derivational functions of English assume an interesting, and perhaps universal configuration. We find functions mapping each of the major syntactic categories onto each of the others. For example:

- \( V \rightarrow A \)  
  \(-ing\)
  \( \_{VA} \)
  sing/a singing teapot  
  swing/a swinging party  
  \(-ive\)
  \( \_{VA} \)
  offend/an offensive person  
  produce/a productive factory

- \( V \rightarrow N \)  
  \(-er\)
  \( \_{VN} \)
  talk/a fast talker  
  swim/a good swimmer  
  \(-tion\)
  \( \_{VN} \)
  obstruct/an inconvenient obstruction  
  invent/a brilliant invention

- \( N \rightarrow A \)  
  \(-ish\)
  \( \_{NA} \)
  pig/a piggish remark  
  child/a childish response  
  \(-y\)
  \( \_{NA} \)
  health/a healthy woman  
  mud/a muddy path  
  \(-ive\)
  \( \_{NA} \)
  offense/an offensive move  
  defect/a defective toy

- \( N \rightarrow V \)  
  \( \emptyset \)
  \( \_{NV} \)
  salt/salt your food  
  truck/John trucked the vegetables to town
It is important to note that, in contrast to these basically suffixal operators, prefixes often leave underlying categories unchanged.

Examples are:

\[ \text{V} \rightarrow \text{V} \quad \text{re-} \quad \begin{align*} \text{do} & \rightarrow \text{redo the problems} \\ \text{paint} & \rightarrow \text{repaint the house} \end{align*} \]

\[ \text{A} \rightarrow \text{A} \quad \text{un-} \quad \begin{align*} \text{characteristic} & \rightarrow \text{an uncharacteristic remark} \\ \text{pleasant} & \rightarrow \text{an unpleasant smell} \end{align*} \]

\[ \text{N} \rightarrow \text{N} \quad \text{ex-} \quad \begin{align*} \text{wife} & \rightarrow \text{Jane is my ex-wife} \\ \text{president} & \rightarrow \text{the ex-president gave a speech} \end{align*} \]

In general, we may represent the functional configuration of the major categories as:

(58)
It is natural to ask whether this general functional configuration is unique to English, or whether it may be a universal feature of morphological derivation. (Appendix F presents some evidence for the latter view.)

In addition, English has two terminal categories: the adverb, which in many ways is a special type of adjective, and the nominal, which is a special type of noun. Examples are

\[
\begin{align*}
A \rightarrow \text{Adv} & \quad \text{ly}_{\text{AAdv}} \\
V \rightarrow \text{Nom} & \quad \text{tion}_{\text{VNom}} \\
A \rightarrow \text{Nom} & \quad \text{ness}_{\text{ANom}} \\
\end{align*}
\]

- elegant/to swim elegantly
- enthusiastic/to sing enthusiastically
- horrible/a horribly complicated example
- extreme/an extremely simple recipe
- destroy/the enemy's destruction of the city
- invade/the American invasion of Laos
- deploy/the deployment of troops
- attain/the attainment of an objective
- wild/the wildness of her gestures
- sad/th: sadness of her smile
- immediate/the immediacy of the problem
- orthodox/the orthodoxy of his solution

It seems likely that adverb and nominal are not universal derivational categories. This question deserves further attention.

The claim that English nominals constitute a minor category is not crucial, but it reflects the fact that nominals receive special interpretation and behave uniquely with respect to syntax (they are never plural, they generally require definite determiners and often require objects in possessive phrases).

The assertion about adverbs is more controversial. There are several
arguments favoring minor status for adverbs. First, with relatively few exceptions (such as very, quite, tomorrow, yesterday) adverbs can be systematically paired with shorter adjectives. If the adverbs are derived from the adjectives, the principle of accretion can be preserved phonologically, and also semantically, in that the adverb can generally be defined in terms of the adjective, but not the reverse. Lakoff has claimed that the reverse derivation of adjectives from adverbs holds, but note that no evidence is available that adverbs generally serve as the arguments for any other function. We do not find nouns or verbs systematically coming from adverbs. The overall schema (58) is simplified by assuming that adverbs are a special type of adjective. Morphological evidence for this view is the fact that cognate languages such as Swedish, German, and Russian treat the adverb as a simple neuter adjective.

A few counter-examples should be mentioned, some of which can easily be dismissed. Illness and sickness may be pluralized, but in this use they are simply synonyms for the noun disease, not nominals. Weakness has a plural, but so does its opposite, strength, which does not exhibit nominal morphology. In French we find verbs from pronouns: tu "thou"/tutoyer "to say thou" and vous "you, pl"/vouyouyer "to say you". Similarly, we find the Finnish verb sinutella "to use the familiar form of address", from the pronoun sinä. In addition, we find minuus, "ego, personality" derived by -us, an abstract noun forming suffix, from minä, "I". In English we find verbs from a few prepositions: to up the ante, to down a beer, to off a cop. Similarly, in German we find the verb Hüssern, "to utter, manifest" ultimately coming from the preposition aus, "out". In English we have the verb of forward a letter and the noun of a forward in soccer from the adverb forward. Russian
has the adjective peredovoj, "foremost, advanced" from the preposition pered, "before, in front of." Russian also shows adjectives from the adverbs today, yesterday, and tomorrow: s'evodnja/s'evodnjašnij, včera/včerašnij, zavtra/zavtrašnij, and Finnish similarly shows the latter two: eilen/eilinen, huomenna/huominen. These are not major patterns of derivation, however, and do not seriously threaten our analysis.

5.5 THE INTERPRETATION OF ADJECTIVES IN NOMINAL PHRASES

In "Remarks on Nominalization" Chomsky very briefly discusses the adjectives which appear with derived nominals, primarily in order to dispose of the suggestion that they are derived from adverbs: "adjectives that appear with derived nominals often cannot appear (as adverbs) with the associated verbs: for example, we have John's uncanny (amazing, curious, striking) resemblance to Bill but not *John resembled Bill uncannily (amazingly, curiously, strikingly)." [p.195] If adjectives are assigned in the base to nominal phrases, we account for the fact that Bill's outrageous refusal to see John is acceptable, while Bill refused to see John outrageously is deviant. The lexicalist hypothesis permits such phrases, but at least as Chomsky formulates it, there seems to be no way to constrain their formulation.

It is obvious that not all adjectives can occur in nominal phrases, but it is not yet clear how a lexicalist hypothesis might seek to exclude them. Clearly, some selectional restrictions or output constraints must be applicable, since we find the following ungrammatical and uninterpretable: *Bill's big orange refusal to see John, *Martha's envious departure, *the bigamous bombardment of civilian targets.
Its apparent shortcomings aside, one of the most valuable insights of the transformationalist position has been that nominals are shown to receive sentence interpretation. Chomsky has sought to incorporate this insight into the lexicalist position by introducing elaborate base rules which guarantee that the nominal phrase will have sentence structure. "The internal structure of the nominal . . . mirrors that of the sentence." [p.211] Within the lexicalist framework, then, the nominal phrase becomes, like S, a recursive element of the base. We find, for example, embeddings of nominals within nominals: Bill's condemnation of Martha's hasty departure . . . George's recognition of Elizabeth's unwillingness to . . .

The problem with this explanation, however, is that adjectives which are necessarily part of "the internal structure of the nominal" would have several different interpretations. For example, the nominals:

(59) Martha's unfortunate departure
(60) Martha's angry departure
(61) Martha's hasty departure

are variously interpreted. Nominal (59) would be associated with a sentence with a sentential adverb:

(62a) Unfortunately, Martha departed.
(62b) It is unfortunate that Martha departed.

The nominal of (60) would be associated with a sentence whose subject is modified:

(63a) Martha angrily departed.
(63b) Martha was angry when she departed.

And the nominal (61) would be associated with a sentence incorporating an adverb on the verb.

(64) Martha departed hastily.
Similarly, we find that de-adjectival nominals are variously interpreted according to the type of adjective in the nominal phrase:

(65) Martha's predictable optimism
(66) Martha's cautious optimism
(67) Martha's extreme optimism

Nominal (65) would be associated with a sentence containing a sentential adverb:

(68a) Predictably, Martha is (was, will be, etc.) optimistic.
(68b) It is (was, etc.) predictable that Martha is (was, etc.) optimistic.

Nominal (66) recalls a sentence whose subject is modified:

(69) Martha was cautious in her optimism.

And nominal (67) would be associated with a sentence with adverb on an adjective:

(70) Martha was extremely optimistic.

Neither the transformationalist nor the early lexicalist hypothesis furnishes a totally satisfying account of these adjectives in nominal phrases. Early lexicalism has no mechanism for explaining the varieties of interpretation. For the transformationalist, the sentential sources for adjectives are so disparate as to greatly complicate the structural description of any rule which seeks to refer to them. Besides, even if we could formally relate these adjectives in nominal phrases to the adverbs in sentences, this would not really help, given the fact that the adverb itself is so poorly understood. (To "explain" adjectives in nominal phrases by such reduction is only to defer genuine explanation.)

The structured lexicon offers an alternative, however. If the lexicon provides nominals derived by lexical rule, as we have tried to
argue, we may posit an essentially free application of the base rules to
generate nominal phrases, and introduce a semantic rule to interpret
these phrases, throwing out those which are meaningless. Such a solution
demands that we motivate for adjectives certain semantic features that will
allow, for example, the exclusion of *John's hasty ignorance and *Martha's
extreme departure, while permitting John's extreme ignorance and Martha's
hasty departure.

Adjectives may be categorized semantically according to the types of
noun that they modify. For example, certain adjectives characteristically
apply to humans: angry, sad, cheerful, proud, calm, frantic, stubborn,
ambitious, impatient, furious. Thus, in the nominal phrase Ethel's stubborn
optimism, it is Ethel, not optimism that is stubborn. We find that the
adverb stubbornly in the sentence:

(71) Ethel is stubbornly optimistic.

is accordingly "subject-oriented" [Jackendoff, 1972]. Stubbornly may not
occur in a sentence that lacks a human subject in deep structure:

(72) *The boulder rolled stubbornly down the hill.

We must enter the adjective stubborn in the lexicon as semantically
HUMAN, and stubbornly will inherit the subject-oriented feature accordingly.

Chapin, Stern, and Sturtevant have all remarked upon peculiarities in
the interpretation of adjectives. Chapin observes:

A very general and interesting phenomenon is the use of
self-ing adjectives to modify nouns which are not themselves
the antecedents of the reflexive pronoun but are connected
in some way with the antecedent. Thus

(95) The witness' testimony was self-incriminating.

In (95) it is not the testimony which incriminates itself, but the
witness who incriminates himself with the testimony. [p.42]

Stern remarks similarly that
it is very common for an adjective to be attributed to a noun with which it is not logically compatible. We speak of the highest bidder, although, strictly the bidder is not high, only his bid is. It is especially common with nomina agentis derived from verbs, the action of which is qualified by the attribute: an early riser, late comers, first offenders, he is a hard student, a long resident, a slow walker, we were both fair runners, a probable winnet of the Derby, a close observer, a wide traveller, a habitual liar. Nouns which denote a person having a certain quality receive an attribute pertaining to the quality, not to the person: a perfect stranger, a total stranger, you are a positive fool, her particular friend. Adjectives of size are similarly used: a great admirer of Tennyson, he was an enormous eater...[p.349]

And Sturtevant notes in the same vein that

in using the phrase "wicked ways," we do not blame the "ways" but the people who walk in them; and the result is a new relationship between the adjective and its noun. A transferred epithet usually ascribes an attribute of personality to an inanimate object, but still without any thought of personification. Carlyle speaks of "ambitious Latin" without implying that language can feel ambition. No one imagines that a "happy event" enjoys itself, or that a "learned treatise" has studied much. [p.145]

As a step toward explanation of these interpretive phenomena, we will develop a classification system for adjectives based on the observations (rather randomly represented in the quotations above) that some adjectives pertain primarily to people, some to actions and qualities, others to physical features (e.g., size) and so on.

Adjectives which pertain essentially to human beings will be assigned the feature [+psychological]. These can then be subcategorized with respect to the feature [evaluative], which will be clarified below. The following adjectives appear to be [+psych, -eval]: careful, eager, angry, sad, cheerful, curious, inquisitive, happy, proud, humble, optimistic, pessimistic, suspicious, skeptical, enthusiastic, grateful, ignorant, calm, frantic, uneasy, impatient, mad ("angry"), wild, fearful, neurotic, reluctant, hesitant, violent, bored, busy, forgetful, confused, stubborn. These adjectives fit into the frame:
(73) John is quite _____A.

Many also fit the frame:

(74) John is _____ to V.

as in:

(75) John is eager to go.
    hesitant
    happy
    proud
    impatient

Examples of adjectives which are [+psych, +eval] are:
careless, reckless, lazy, intelligent, clever, unwise, wise, nasty, thoughtless, maudlin, sentimental, naive, pompous, irreverent, superstitious, kind, thoughtful, considerate, modest, impudent, ridiculous, cruel, polite, impolite, stupid, selfish, insolent, smug, stingy, rebellious, mad ("crazy"), irresponsible, brave, pretentious. These adjectives fit frame (73) and many fit frame (74):

(76) John is clever to go
    thoughtful
    considerate
    stupid
    mad
    brave

All of these adjectives fit frame (77):

(77) It was _____A of John to V

as in:

(78) It was careless of John to tell Martha about Alice.
    nasty
    clever
    thoughtless
    thoughtful
    brave

The [+psych] adjectives are generally permitted as the modifiers of
derived nouns and nominals: a modest proposal, a stupid remark, a clever statement, John's angry refusal to leave, Martha's careful investigation of the facts, Alice's stubborn determination, selfish ambition, cautious optimism, a cheerful reply, polite skepticism, ignorant gossip, vicious attacks, smug complacency, puritanical intolerance. Even when they clearly denote physical objects, the derived nouns may have [+psych] adjectives as modifiers. Thus we have a thoughtful gift, cheerful donations, and a reluctant refund, but not *a thoughtful pair of cuff links, *cheerful money, or *a reluctant ten dollars.

The [+psych] adjectives modify the derived nouns and nominals, however, only when these come from verbs which have deep-structure [+human] subjects or from adjectives which are themselves [+psych]. Thus, we do not have *a thoughtful result, *an angry development, *polite fatness, *careful redness, *the Ohio River's selfish flooding of the town, *the hurricane's neurotic destruction of homes, *modest inevitability, *proud irrelevance.

Adjectives that characteristically modify actions or qualities will be assigned the feature [+nominal]. (It may be desirable to subcategorize further, particularly with respect to deverbal and de-adjectival nominals). The following are [+nom]: easy, quick, slow, fast, difficult, terrible, extreme (strictly with de-adjectival nominals), tragic, provocative, immediate, timely, correct, incorrect, frequent, evident, obvious, probable, certain, justifiable, regrettable, crucial, complete, utter, total, prompt, undeniable, apparent, arbitrary, late, habitual, regular. These adjectives do not fit frames (73), (74), or (77). They appear as the modifiers of nominals:

John's easy dismissal of Martha's objections, Sarah's extreme intolerance, the tragic destruction of Vietnam, the undeniable efficacy of our methods,
the students' habitual tardiness, Bill's probable departure on Friday, Martha's total negligence, George's utter indifference.

Adjectives that characteristically describe physical objects receive the feature [+physical]. Examples are: solid, flimsy, thin, thick, fat, tall, high, red, old, big, sour, sweet, wide, colorless, heavy, empty, soft, quiet, harsh, loud, rough, crude, smooth, beautiful, ugly, broad, deep, long, light, bright, dark, enormous, huge, tiny, rotten. Another group of adjectives applies to animates, but not necessarily humans. These are specified [+animate]: hungry, sleepy, pregnant, helpless, healthy, clumsy, young.

The last major grouping is the set of [+open] adjectives which apply to all of the types of noun enumerated. These open adjectives can co-occur with any of the features [+phys], [+animate], [+psych] or [+nom]: unusual, good, bad, admirable, ridiculous, interesting, strange, foolish, harmful, dangerous, rare, helpful, common, useful, peculiar, useless, suspicious ("strange"), doubtful, ordinary, boring, confusing, wonderful, incredible, repulsive, disgusting, unpleasant, deceptive, hopeless, pathetic, perfect, nice, charming, pleasant, outrageous, commonplace, unique, special. Peculiar, for example, modifies nouns of all types: a peculiar table, a peculiar dog, a peculiar person, a peculiar remark, John's peculiar indifference to pain, Martha's peculiar refusal to examine the facts, the barn's peculiar redness, Bill's peculiar impatience. Similarly, with the adjective disgusting: a disgusting picture, a disgusting cat, a disgusting person, a disgusting announcement, John's disgusting apathy, Elizabeth's disgusting rejection of all moral arguments, Arthur's disgusting departure at a crucial moment, the dean's disgusting liberalism.
It seems obvious that since most concrete physical objects have no psychology, [+psych] adjectives will not modify them. Thus, we do not find *a thoughtful rock, *a cheerful turnip, or *lecherous fireplugs. There are many apparent counterexamples to this generalization, however: a clever house, a thoughtful book, irreverent clothes, a careful portrait, a modest workshirt, militant posters, an impudent mustache, puritanical hemlines, affluent suburbs, enthusiastic telegrams, barbaric fragmentation bombs, cruel weapons, an ambitious new railroad, grateful letters, a sentimental birthday card.

In these cases, the [+psych] adjectives can often be conjoined with ordinary [+phys] adjectives: a big thoughtful book, a modest blue workshirt, huge militant posters. This phenomenon is related to a problem discussed by Chomsky in "Remarks on Nominalization," where "two senses of [a] word can be combined in apposition," [fn 12, p.218] as in this book, which weighs five pounds, was written in a hurry. Modifiers impose upon a noun a particular type of interpretation: it is obvious, for example, that a person sent to find a maudlin book will search in a very different way from a person seeking a mauve book: one of them examines only the covers, while the other must read the contents.

Observe further that maudlin cannot be identically interpreted as the modifier of book and person. If we say that a book is maudlin, we imply that it is full of sentimental characters, mawkish writing, affected emotion, and so on. If we say that a person is maudlin, however, we mean that he behaves in a particular way.

Why, if the mode of interpretation is so different, is the same adjective used to describe the person and the object? What do a maudlin book and a maudlin person have in common? Apparently, the book is considered to be the
expression of a maudlin person; it is expressive of human psychology, in other words.

The set of physical objects which can be viewed as the expression of human personality is culturally determined, not linguistically determined. Objects which are not man-made may not be so viewed: *impudent trees, *a careful lake, *cautious aluminum, *enthusiastic snow, *thoughtless air, *superstitious carrots. Most aesthetic creations, many articles of clothing, and certain other human artifacts (e.g. houses, automobiles, furniture) may acquire this expressive feature—although the full range of psychology is obviously not expressible in each case: clever house, but not *apathetic house.

One can imagine the following interpretive process. When a [+psych] adjective is found modifying a [-human] noun, the semantic component first seeks the feature [+nom]; if it is present, the adjective is taken as modifying the subject (even if unexpressed) of the nominal: a careful investigation (undertaken by someone who is careful), a wise alteration in our plans, an intelligent solution to the problem, John's passive resistance, Martha's stubborn refusal to talk. If the noun is not nominal, the semantic component assigns the semantic feature [+expressive] and reinterprets. Thus, a thoughtful book is a book whose author was presumably thoughtful, to some extent; grateful telegrams are composed by grateful people; clever fragmentation bombs reveal the cleverness of the manufacturer, and so on. If the semantic component cannot, due to cultural fact, assign the feature [+expressive], the NP receives no intelligible interpretation and the utterance containing it is classified as deviant: *grateful tomatoes, *impertinent thumbtacks, *optimistic stop signs, *thoughtless carpet.
It is apparent that some NP's will remain uninterpreted, although they meet these feature specifications. We will probably want to exclude *optimistic pessimism, for example, although optimistic is [+psych] and pessimism is the nominal of a [+psych] adjective. Since the two adjectives are semantically contrary, interpretation becomes strained. In some cases, speakers may force an interpretation despite contradiction in order to obtain stylistic effect: cruel charity or stingy liberalism.

We are in a position to predict, however that dangerous cynicism is interpretable, while *cynical danger is not. As we indicated above, dangerous is a [+open] adjective. It is thus entirely acceptable as the modifier of a [+nom] noun like cynicism. John's dangerous cynicism is thus interpretable as: it is dangerous (John is cynical), or it is dangerous for John to be cynical.

The adjective cynical is inherently [+psych], however, and thus can evaluate nominals only if they have deep-structure human subjects. Danger is the abstract noun related to dangerous, but it is not inherently [+psych] (the danger of falling rocks), so cynical is excluded as a potential modifier. Thus, *cynical danger is not interpretable.

The nominal phrase John's angry suppression of the facts is interpretable, because angry is [+psych] and the nominal suppression is derived from the verb suppress, which takes [+human] subjects. Thus, the phrase is associated with the sentence: John is angry and John suppresses the facts. John's dangerous suppression of the facts is associated with it is dangerous (John suppresses the facts), or it is dangerous for John to suppress the facts, by arguments similar to those noted above.
We have seen, then, that adjectives normally attributed to human beings may be applied to nominals and to physical objects (which have acquired the feature [+expressive]), and we have observed the interpretive principle used to understand such combinations. It happens also that [+phys] adjectives are often attributed to nominals and to humans, but with a radical alternation in meaning.

Examples of [+phys] adjectives which can become [+psych] are: sharp, sour, warm, cold, cool, smooth, dull, rough, flexible, sweet, crude, plastic, transparent, square, colorful, tense, bland, narrow, simple, crooked, fiery, tight, loose, plain, vacuous, brilliant, bright, broad, wooden, straight, dense, depressed, high, flat, well-rounded, heavy. These are used in NP's like: a heavy chick, a sharp dude, a dull student, a straight friend, a cool reception, colorful eccentricity, a bright child, square parents, a warm acquaintance.

The meanings of these adjectives as [+psych] modifiers cannot be productively derived from the physical meaning; many physical adjectives fail to receive such interpretation: cylindrical, tall, circular. Although these facts are not, in general, predictable—and thus require individual listing in the lexicon—it should be apparent that there is a tendency in English (and probably in many other languages) to regard the human personality as an object, a "thing" that can be described in physical terms. The physical vocabulary serves as a source for innovation in the psychological vocabulary. This fact is probably best expressed as a diachronic semantic universal: over time, [+phys] adjectives tend to acquire the feature [+psych].

It is also possible for [+phys] adjectives to participate in the nominal
dimension, again with an extension of meaning: slight recognition, deep conviction, extensive investigation, small promise, massive neglect, broad reform, thin support, shaky optimism, great confusion, flimsy justification, high hopes, wide travel, thick settlement, gross overpopulation, shallow commitment, loose construction, stiff resistance.

Like extensions into the psychological sphere, this use of adjectives is idiosyncratic, and thus must be noted in the lexicon for each entry. Obviously, optimism cannot be said to be shaky in the same sense that a table is. Still, however, arbitrary the individual case, there is a general tendency to extend physical adjectives in this manner. We expect historical semantic change to occur in this direction. Two good examples of such semantic shift are profound and great which are now almost strictly [+nom], although they were once physical. (Cf., French profound and grand, which still retain the physical meanings as well: un enfant grand pour son âge "a child big for his age" and puits profond "deep well.")

The feature [evaluate] introduced above to subcategorize the feature [psych] has not yet been adequately motivated. It serves to distinguish proud from pompous and forgetful from inconsiderate. Proud and forgetful are strictly descriptive, while pompous and inconsiderate introduce value judgements. We have noted that [+eval] adjectives regularly occur in frames like the following:

(79) It was pompous of John to insist on being picked up in a limousine.

(80) It was inconsiderate of Martha to ignore her guests.

In general, the purely descriptive [-eval] adjectives do not occur in such contexts:
(81) *It was proud of John to wear a tuxedo.

(82) *It was angry of George to swear at Jane.

As we turn to the derivation of adverbs, it is interesting to note a set of sentences noted by Jackendoff [1972, p.57]. He observes that sentences (83) have paraphrases (84) and (85):

(83) Carefully
    Cleverly ,
    Clumsily

(84) John was careful to spill the beans.
    careful
    clever

(85) It was clever of John to spill the beans.
    clumsy
    *careful

There is more to say about these examples. First, John was careful to spill the beans means John made certain that he spilled the beans; he may have spilled them in either a careful or a sloppy manner—the point is that he sought to do it. (It is probably best to consider be careful to \(v \) as an idiom that functions as a unitary verb, just as be happy to \(v \) means agree to \(v \).) Second, it is not always the case that sentences like (83) have such paraphrases. Observe in particular that sentences (86) do not mean (87):

(86) Eagerly ,
    Proudly
    Reluctantly
    Impatiently
    Hesitantly

(87) John was eager to spill the beans.
    proud
    reluctant
    impatient
    hesitant
while sentences (88) do mean (89):

(88) Wisely John spilled the beans.
    Impudently
    Cruelly
    Stupidly
    Politely

(89) John was wise to spill the beans.
    impudent
    cruel
    stupid
    polite

In sentences (87), the judgment about John temporally precedes the spilling of the beans; indeed, the beans may never have been spilled. In the sentences (89), however, the judgment of John is subsequent to the deed. Observe that only the adjectives of (53) appear in the frame:

(90) Spilling the beans was a __________ thing to do.
    wise
    cruel
    *eager
    *hesitant

The adjectives of (89) are all [+eval], while those of (87) are descriptive, or [-eval]. In sentences (87) the adjectives are directly descriptive of John, while in (89) they describe the speaker's feeling about John's behavior. This recalls Jackendoff's dichotomy between subject-oriented and speaker-oriented adverbs, probably the key to many of the problems we have raised here.

The adjective categories which we have developed in this section help to explain the semantics of adjectives in agent phrases as well. Lakoff's sentence:

(91) John is a merciless killer of men.

is interpreted as:

(92) John kills men and John is merciless in his killing.
(93) John is a cheerful killer of men.

is read as:

(94) John kills men and John is cheerful in his killing.

Both of these adjectives are [+psych], and the first is also [+eval], as shown by the sentence:

(95) It was merciless of John to kill the men.

We do not find interpretations of this type for the sentences:

(96) John is a habitual killer of men.

(97) John is a gradual killer of men.

Here the adjectives modify the action, rather than the person, so in our system they are [+nom]. The interpretations are:

(98) John kills men and the killing is habitual.

(99) John kills men and the killing is gradual.

Note that we do not find, as part of the interpretation:

(100) *John is habitual.

(101) *John is gradual.

If we were to derive the adjectives from adverbs in sentences by an agent transformation, we would no longer have any basis for these insights, since the adverbial cases are syntactically invariant, despite semantic differences:

(102) John kills men mercilessly.

cheerfully
habitually
gradually

The superiority of the functional lexicalist derivation should be evident.

Note finally that we have found a way to explain the fact that examples like endorse sloppily and sloppy endorsement share common elements of meaning without deriving one phrase from the other, which would violate the principle
of accretion no matter which way we chose to do the derivation. In the functional lexicalist treatment we encounter no such contradiction, since words can be related in other than transformational ways. Morphologically, we are able to go both ways at once, to derive sloppily from sloppy and still get endorsement from endorse.

The analysis of this section is in many ways incomplete, but hopefully enough evidence has been offered here to support the view that an interpretive theory based on semantic features is, in principle, possible. Such an interpretive theory is indispensable to the overall development of structured lexicalist theory.
APPENDIX A – THE CLASSIFICATION OF DEVERBAL N’S

A.1 NOMINALS AND NOUNS

We have observed that noun-like formatives derived from adjectives and verbs fall into two distinct classes based upon their semantic interpretation. One set of derivatives, which we have chosen to call the nominals, receive S-interpretation, while members of the other set, the deverbal nouns, typically receive NP-interpretation.

For example, destruction, the derivative of destroyv in

(1) The destruction of the monument occurred at five o’clock.

is clearly being used as a nominal. The formative can take a by-phrase, as in

(2) The destruction of the monument by terrorists occurred at five o’clock.

and it receives S-interpretation:

(3) Terrorists destroyed the monument at five o’clock.

The sentence

(4) John saw the destruction.

is ambiguous, however, since both nominal and noun readings of destruction are available. Under nominal reading, sentence (4) means

(5) John saw something being destroyed.

Here the interpretation is one of PROCESS or ACT. With a noun reading, however, sentence (4) may have the meaning

(6) John saw what was left after something was destroyed.

With this interpretation, sentence (4) is synonymous with the unambiguous

(7) John saw the wreckage.

where only the RESULT or CONSEQUENCE interpretation is permitted.
Similar to destruction is the derivative installation, from install, where the sentence

(8) John saw the installation.

may have either the nominal reading

(9) John saw something being installed.

or the noun reading

(10) John saw what had been installed.

A.2 FEATURES ON DEVERBAL NOUNS

Deverbal nouns may be categorized by the features [Concrete] and [Count], minus values being [Abstract] and [Mass]. In many cases deverbal nouns turn out to be homophonous with related derived nominals. For example, the noun destruction of sentence (4) is [-Concrete, -Count]. The fact that destruction is [-Count] may be observed in the following question and answer:

(11) Was there any destruction today?

(12) Yes, there was some.

No plurals are permitted: *five destructions, *few destructions. That the noun is [-Concrete] is shown by its use with the modifiers great and slight, which cannot be used with concrete nouns: *great sugar, *slight sand.

Not all nominals have homophonous abstract mass nouns of this type however. For example, departure is the nominal of depart, in

(13) The plane's departure is occurred at five o'clock.

This sentence shows S-interpretation of the nominal, with paraphrase

(14) The plane departed at five o'clock.

We note, however, that the response to question (15)

(15) Was there any departure today?
differs from (12):

(16) Yes, there was one.

In the noun, plurals occur: five departures, few departures, much departure. Clearly, departure is [+Count]. Like destruction it is [-Concrete], however, since [+Physical] adjectives tend not to apply: a red departure, a thick departure, a sticky departure. As a noun, then, departure is [-Concrete, +Count].

The noun installation is [-Concrete, +Count]. The fact that it is concrete is indicated by the occurrence of [+Physical] modifiers: a big installation, a hidden installation. The count feature is supported by the plurals: multiple installations.

The noun surveillance, which has no underlying verb at the surface in modern English, functions as a derived noun nonetheless. Its feature specification is [-Concrete, -Count]. The mass feature is supported by the absence of plurals and the occurrence of forms with much and little: many surveillances, much surveillance, few surveillances, little surveillance. The abstract feature is evident from the non-occurrence of [+Physical] adjectives: sticky surveillance. Rather, we find such abstract modifiers as effective, careful, elaborate.

Thus, we find that all four of the feature combinations of [Concrete] and [Count] are exhibited in nouns with nominal morphology. Another example of a [+Concrete, +Count] derivative is the word obstruction. As a noun it has the non-human agentive meaning THAT WHICH V'S. We find the noun is regularly modified by [+Physical] adjectives: a huge obstruction, a small obstruction, sharp obstructions, immovable obstructions. We find plural desinences: many obstructions, few obstructions. Occasionally the noun is used as mass, however, as shown by the sentence:

(17) Was there much obstruction of traffic?
Condensation, like destruction, exemplifies the concrete mass noun, a RESULT noun meaning THAT WHICH IS V'D. The noun falls into an analogy with frost, as the following proportion suggests:

\[(18) \text{freeze}_v : \text{condense}_v :: \text{frozen}_a : \text{condensed}_a :: \text{frost}_n : \text{condensation}_n\]

As with frost, we find [+Physical] modifiers: thick condensation, hard condensation, visible condensation. The noun is mass, as shown by much condensation, little condensation, *many condensations, *few condensations. Again, however, we find exceptional use, as in

(19) Repeated condensations are required to effect the process.

This is not surprising, since even with ordinary mass nouns like sugar we sometimes find count morphology manifest:

(20) Glucose is one of many sugars used by the body.

Distillation works exactly the same way:

(21) Repeated distillations are required to effect the process.

Another example of a derived concrete mass noun is population, presumably from the verb populate. In general the word is modified by [+Physical] adjectives; sparse population, dense population, large population, extensive population, varied population. Some [+Animate] adjectives also occur, as in a healthy population. When the word borders on the derived noun populace in meaning, we also find [+Psychological] adjectives as modifiers, as in a cheerful population, an enlightened population, an aware population. In general, the noun population is mass: little population, some population, no population, much population. Again, however, we find count morphology, as in:
(22) Can you cite the populations of the major American Indian tribes?

(23) We have isolated three populations from our experiment. In these meanings, the word means either NUMBER or GROUP.

It may be objected that population is semantically abstract, that it cannot be a concrete entity. From a semantic point of view, this is partially true, of course, but the use of such concrete modifiers as big and dense clearly distinguishes it from other derived nouns which are truly [-Concrete], like confusion. We do not find *large confusion, *thick confusion, *homogeneous confusion, or *sparse confusion.

The features [-Concrete, +Count] are evident in deverbal nouns like reorganization, a form which is also homophonous with an associated nominal. We do not, in general, encounter [+Physical] adjectives as modifiers: *dense reorganization, *sparse reorganization. We do find more abstract modifiers, as in thorough reorganization, complete reorganization, democratic reorganization. The noun reorganization denotes a countable EVENT, and so we find the phrases periodic reorganizations, monthly reorganizations, unexpected reorganizations, subtle reorganizations.

Again, we observe, however, that not all nominals have homophonous count nouns of this type associated with them. For example, we find nominal phrases like the periodic relegation of radicals to insignificant offices or the annual institution of new regulations where the nominals receive S-interpretation, but we cannot refer simply to the plural forms *the periodic relegations or *the annual institutions. There are no count EVENT nouns derivable from the verbs relegate and institute. In fact, even organization differs from reorganization in this respect. We may speak of the periodic
organization of new anarchist collectives, where organization appears as a nominal, but we cannot use this word as an EVENT noun: *the periodic organizations of last year. As a noun, organization is strictly concrete and count, meaning GROUP: large organizations, intimate organizations, coherent organizations.

Knowledge is an abstract mass noun, idiosyncratically derived from the verb know. Like its antonym ignorance (which has no verbal source at the surface, since ignore is not appropriate in meaning), this word may not be a nominal. It is not the nominal of know in the meaning TO BE ACQUAINTED WITH A PERSON. We may not refer to *John's lifelong knowledge of Bill. Nor is knowledge the nominal of the verb know in its meaning TO BE COGNIZANT OF. We can say

(24) John knows the answer.

But the nominal *John's knowledge of the answer is peculiar, as is *John's ignorance of the answer. These restrictions on the use of knowledge and ignorance arise at the lexical, not the semantic level, as shown by the grammaticality of John's lifelong acquaintance with Bill and John's awareness of the answer. Knowledge must be entered in the lexicon as [-Nominal].

Its derived noun use is quite consistent with the features [-Count, -Concrete]. The mass character of the word is evident in the phrases much knowledge, little knowledge, more and more knowledge, *many knowledges, *few knowledges. (It is interesting that the Russian word znanije does have a plural, although it translates knowledge perfectly as the derivative of znat', "to know".) This is again a lexical fact, not a deep semantic one, as shown by the English plural abilities, which is close in meaning.

To some extent [+Physical] modifiers are allowed, as in deep knowledge,
superficial knowledge, shallow knowledge, extensive knowledge, but in general this use is metaphorical and the noun is to be considered basically abstract. An indicator of this abstractness is the use of the adjective great (opposite slight) as a modifier in, for example, John's great (slight) knowledge of cooking. As we noted above, these modifiers do not apply to concrete mass nouns. In this respect knowledge parallels other abstract mass nouns, in particular parameters like depth and length: great depth, great length. In the sentence

(25) John's knowledge of nonverbal communication surprised Martha.

the adjective great is understood to be the implicit modifier of knowledge. This again parallels the behavior of parameters:

(26) Martha was anxious about the (great) depth of the river.

The [-Concrete, -Count] noun knowledge is closely related semantically to wisdom and experience, the first a morphologically irregular derivative of the adjective wise and the second apparently an abstract zero-derivative of the verb experience. (Perhaps the latter is to be accommodated somehow as the de-adjectival derivative of the longer participle experienced, however.) All are [-Concrete], as shown by the modifiers great and slight, and all are mass: much knowledge, little wisdom, some experience.

Homophonous with the abstract mass noun experience is the abstract count noun experience meaning EVENT. Experience, like wisdom and knowledge, is regarded by the grammar as an abstract substance which is to be accumulated or piled up, while experiences are events which are separable and countable.
APPENDIX B - SEMANTIC REGULARITIES IN DERIVED NOUNS WITH NOMINAL MORPHOLOGY

B.1 ALLOFUNCTIONS OF $-\text{TION}_{VNom}^-$

The hypothesis which we have been pursuing, that of a lexicon structured by derivational functions, suggests a level of regularity that falls somewhere between the essentially total predictability that we expect from transformational analysis and the virtually total idiosyncracy which is implicit in extreme lexicalism. The notion of derivational function permits us to capture semantic, syntactic, and phonological regularities, while allowing for sub-regularities and exceptions.

We have already noticed that derived nominals (which receive S-interpretation) must be distinguished from derived nouns (which receive NP-interpretation). In a great number of cases the morphology has assigned a particular phonological representation to multiple syntactic/semantic slots. In particular, nominals and derived nouns often share a single phonological shape.

Stated more specifically, the basic function $-\text{tion}_{VNom}^-$ has a primary allofunction $-\text{ment}_{VNom}^-$ and several other minor phonological allofunctions. These functions yield nominals, but they also regularly provide shapes which are assigned the same types of semantic representation as deverbal nouns derived by other means, for example by zero-derivation and stress-shift, processes which never yield nominals.

B.2 SEMANTIC REGULARITIES

Examining count nouns derived from verbs by the suffix $-\text{tion}$ and its allofunctions, we observe semantic regularities. We find, for example, that
the verbs

(1) impede, hinder, obstruct, block, annoy, bother, limit
    restrict, distract, inhibit

share a common core of meaning. All are transitive and imply, concretely
or abstractly, the notions of OBSTACLE TO INTENTION. Nouns derived from
these verbs, whether by nominal morphology, zero-derivation, or other means

(2) impediment, hindrance, obstruction, block, annoyance, bother
    limitation, restriction distraction, inhibition

generally have the meaning OBSTACLE. Syntactically, several of these nouns
may take to NP as complement:

(3) John's blindness is an impediment to his advancement.
(4) The constant noise is a hindrance to my work.
(5) The parked van is an obstruction to traffic.
(6) Martha's dog is an annoyance to the neighbors.

There is no transformation operative here, however, since although prevent,
retard, and thwart belong semantically in group (1), and we have

(7) The wall prevents people from falling off the cliff.
(8) The chemical retards decomposition.
(9) The discovery thwarts bureaucratization.

we find no derivative nouns in these cases:

(10) *The wall is a prevention....
(11) *The chemical is a retardation....
(12) *The discovery is a thwart....

Derivational functions capture the subregularity of these examples without
recourse to transformations. We need only assume that the morphological
operators -tion, -ment etc., assign various meanings to derived deverbal
nouns. Among those meanings we find, fairly regularly, "that which V's".
Each such derivative must be listed separately in the lexicon, since not all verbs show derivatives with this meaning. The theory that we have developed leads us to expect a lexicon that is both structured and idiosyncratic. The evidence which follows is empirical justification of this view.

Another group of verbs

(13) extend, prolong, enlarge, expand, project, add, supplement, insert

share the underlying idea of GROWING. The nouns derived from these verbs, when count, refer to GROWTH:

(14) extension, prolongation, enlargement, expansion, projection, addition, supplement, insertion.

Thus we have the sentences:

(15) Sharp projections on automobiles are now prohibited by law.
(16) Meetings may be held in the addition to the student union.
(17) We analyzed the story in the supplement to today's paper.
(18) Did you receive the insertion (or insert) in yesterday's bulletin?

Similarly, the verbs

(19) adapt, modify, improve, enhance, refine, simplify, complicate, enrich

all imply QUALITATIVE CHANGE. These derived nouns, whether from -tion or -ment, share the meaning "that which V's". This parallels the zero-derivation of the verb change itself, where the derived noun change has an analogous meaning. Thus, we find alongside the sentences

(20) John changed the arrangement of his room.
(21) Arthur improved the gizmo.
(22) Engineers enhanced the stereo's audible range.
the derived nouns of the sentences:

(23) The change in John's room was the addition of a new rug and two new paintings.
(24) The improvement was a longer whatsit.
(25) The enhancement was a broadening of higher frequency response.

Like the CHANGE verbs we encounter

(26) cancel, ornament, decorate, embellish, garnish, endorse, sign, note

which have derived nouns meaning CONCRETE CHANGE, "that which V's":

(27) cancellation (of a stamp), ornamentation, decoration, embellishment, garnishment, endorsement, signature, notation.

And so the verbs of the sentences

(28) The stamp was cancelled in blue ink.
(29) The chamber pot was gaily decorated.
(30) John endorsed the check sloppily.

are related morphologically to the nouns of

(31) The cancellation was blue.
(32) The decorations were gay.
(33) John's endorsement was sloppy.

Another set of related verbs is

(34) create, compute, formulate, translate, render, compose, publish, revise, contribute, accomplish, attain, achieve, acquire

which have associated derived nouns with the meaning "that which is V'd"

(35) creation, computation, formulation, translation, rendition, composition, publication, revision, contribution, accomplishment, attainment, achievement, acquisition.
Some examples relating the nouns and verbs are:

(36) John translated the article.

(37) A foundation contributed a million dollars for research.

(38) The museum acquired a new painting.

whose verbs are morphologically related to the nouns of

(39) John's translation is on page twenty.

(40) The foundation's contribution was smaller than expected.

(41) The new acquisition will be exhibited next month.

Another set of verbs describing actions

(42) receive, inspect, transact, exhibit, interrogate, confront, dedicate, initiate, consecrate, bury, baptise, celebrate, elect, inter

have associated nouns referring to events:

(43) reception, inspection, transaction, exhibition, interrogation, confrontation, dedication, initiation, consecration, burial, baptism, celebration, election, interment

Semantically, these nouns are parallel to the zero-derivative *harvest* from the verb *harvest*:

(44) Farmers harvest corn at the end of the summer.

(45) The harvest is late this year.

The nouns of (43) mean "that during which one V's":

(46) The queen received the American ambassador.

(47) The reception was very formal.

Similar to (43) in semantics are *commencement*, *exposition*, and *coronation*. The first two are derived from verbs which are not quite appropriate in meaning, *commence* and *expose*, while the third is an irregular derivative of the verb *crown*. *Depression* and *recession* also seem to be derived event
nouns, but again the underlying verbs, *depress* and *recede*, are not directly related.

From the "action" verbs

(48) invade, intervene, violate, transgress, detonate, provoke, erupt, explode, retaliate, disturb, agitate

we find the "event" nouns

(49) invasion, intervention, violation, transgression, detonation, provocation, eruption, explosion, retaliation, disturbance, agitation.

The nouns *incursion* and *reprisal* belong with this group, although they have no underlying verbs. In general, the nouns of (49) are parallel in meaning to the zero-derivative *attack* from the verb *attack*.

Yet another set of verbs

(50) excavate, settle, fortify, connect, terminate, reside, dwell

yield derived nouns referring to places. The nouns of (51) mean "that in which one V's" or "That where there is V'ing":

(51) excavation, settlement, fortification, connection, termination, residence, dwelling

Less regularly, we find *junction* and *juncture*, both presumably from *join*. Alongside *residence* and *dwelling* we find the archaic *abode* from *abide*. The noun *plantation* seems to belong in this group, although the connection with the verb *plant* is not direct. All these nouns are parallel in meaning to the zero-derivative of *dump*:

(52) We need to dump our garbage.

(53) Take it to the dump.

The following verbs involving verbal expression, whether written or spoken also show count noun derivatives, many via -tion:
(54) salute, accuse, indict, state, resolve, condemn, declare, proclaim,
exclaim, observe, explicate, ejaculate, notify, interpret, regulate,
recommend, define, command, correct, contradict, communicate,
introduce, describe, prescribe, predict, justify, object, suggest,
stipulate, require.

The nouns of (55) mean "that in which one V's":

(55) salutation, accusation, indictment, statement, resolution,
condemnation, declaration, proclamation, exclamation, observation,
explication, ejaculation, notification, interpretation, regulation,
recommendation, definition, commandment, correction, contradiction,
communication, introduction, description, prescription, prediction,
justification, objection, suggestion, stipulation, requirement.

They are parallel in meaning to the zero-derived nouns of the verbs charge,
claim, guess, and order:

(56) The policemen charged John with larceny.
(57) Martha claimed that Bill had insulted her.
(58) Elizabeth guessed the combination of the safe.
(59) The company ordered that the plant be closed.
(60) The charge was unfounded.
(61) Martha's claim angered Bill.
(62) Elizabeth made a good guess.
(63) The order surprised the workers.

We observe that nouns of this sort take that-clause complements if the
underlying verbs do:

(64) The governor proclaimed that Tuesday is Gopher Day.
(65) John predicted that the world would end next week.
(66) The governor's repeated proclamations that Tuesday is Gopher Day
amused the press.

(67) The prediction that the world would end so soon worried John's wife.

The nouns reinforcement (count), replacement (count), opposition (mass), and congregation (usually mass) derive from underlying reinforce, replace, oppose, and congregate and generally mean "that which V's", although they may also mean "the one(s) who V":

(68) Reinforcements replaced the fallen soldiers.

(69) Replacements for faculty on leave will be recruited by the Dean.

(70) The rightist opposition angrily fought against the leftist program.

(71) The congregation disliked their new minister.

The feature [+Human] is optionally assigned to the first three derivatives and obligatorily assigned to the last. The assignment of this feature is consistent with selectional restrictions on the subjects of their underlying verbs. Refreshment and nourishment also have the semantic interpretation "that which V's" and are strictly [-Human] in accordance with selectional restrictions on their underlying verbs.

An emission is "that which is emitted," just as an injection is "that which is injected." The nouns reflection, selection, collection, assumption and assertion are similarly "that which is V'd". An embarrassment or disappointment, however, is "that which V's".

The transitive verbs lacerate, abrade, and incise, and the intransitive inflame and swell have the derived nouns laceration, abrasion, incision, inflammation and swelling. Semantically related is contusion, which has no verbal source. These nouns are similar to zero-derived nouns from the verbs tear, cut, and hurt.
B.3 SUMMARY

What we have shown in this appendix is that derived nominal morphology (in particular, the suffizes -tion and -ment) yields derived nouns with semantic content similar to that found in other deverbal noun derivatives.

In the following table, the nouns on the left have nominal morphology, while those on the right are similar zero-derivatives:

\begin{align*}
(72) & \text{obstruction, impediment} & \text{block}_N \\
& \text{extension, enlargement} & \text{supplement}_N \\
& \text{adaption, improvement} & \text{change}_N \quad \text{(abstract)} \\
& \text{decoration, embellishment} & \text{change}_N \quad \text{(concrete)} \\
& \text{creation, achievement} & \text{report}_N \\
& \text{reception, interment} & \text{dance}_N \\
& \text{excavation, settlement} & \text{dig}_N \\
& \text{salutation, indictment} & \text{claim}_N
\end{align*}
APPENDIX C - NOUNS AND NOMINALS FROM ADJECTIVES

C.1 NEUTRAL PARAMETERS AND FACTIVE NOMINALS

Two major types of nouns derived from adjectives must be distinguished: neutral parameters and factive nominals. In some cases the morphology formally manifests this distinction, as in wide_{A}/width_{N}/wideness_{Nom} and dense_{A}/density_{N}/denseness_{Nom}, but the difference is quite subtle and for many speakers the latter formatives may be in essentially free variation. The semantic distinction between the two is clear, however.

The neutral parameter occurs with verbs involving quantity and measurement: estimate, evaluate, measure, ascertain, guess at, depend upon, affect, alter, change. The following are examples where the de-adjectival derivative is a neutral parameter:

(1) The senator guessed at the strength of his opposition.
(2) Mark estimated the length of the logs.
(3) The engineers determined the width and depth of the river.
(4) The teachers tried to evaluate the pupils' intelligence.
(5) The nurse measured Martha's height and weight.
(6) The committee sought to ascertain the truth of the students' accusation.
(7) Students' interest in your course will depend upon the relevance of its subject matter to their lives.
(8) The density of smog is affected by changes in the weather.

The neutral parameter is generally derived from the "positive" pole: strong (+)/weak, long (+)/short, deep (+)/shallow, wide (+)/narrow, high (+)/low, heavy (+)/light, true (+)/false, intelligent (+)/stupid, sweet (+)/sour. The choice of the positive pole for the parametric derivative is consistent
Some adjectives appear to lack parameters of this type:

(18) How full is the gas tank? Martha asked about the ___ of the gas tank.

On the other hand, some parameters have no directly associated adjectives: circumference, volume, area, distance, potential, capacity, pressure, amount, quantity, level, degree, extent. Big, far, and much appear vaguely to express the content of some of these parameters, and capacious is associated to capacity for some speakers (although not for its electrical meaning, however.)

In contrast to the neutral parameters, factive nominals are not restricted to the positive pole:

(19) The shallowness/narrowness of the river surprised the explorers.

(20) The stupidity of the Attorney General both amused and frightened the citizenry.

(21) The weakness of the current made bridge-building easy.

(22) The falseness of the charges was evident to all.

As we observed earlier, some speakers morphologically distinguish certain of the factive nominals from neutral parameters, preferring -ness forms for the former:

(23) Our flight was delayed because of the denseness (*density) of the fog.

(24) Helen was impressed by the wideness (*width) of the river.

(25) Galileo was persecuted for the profaneness (*profanity) of his science.

(26) The deepness (*depth) of the Grand Canyon surprised the explorers.

(27) The warmness (*warmth) of the weather annoyed our visitors.
Note the curious fact that although *highness*, *goodness*, *heaviness*, *richness*, and *trueness* exist, they are not the nominals of the ordinary senses of *high*, *good*, *heavy*, *rich*, and *true*:

(28) John's perpetual *highness* comes from invererate pot smoking.
(29) Elizabeth's self-effacing *goodness* is simply intolerable.
(30) The *heaviness* of Marcuse's style makes his work hard to read.
(31) Danish food is famous for its *richness*.
(32) The monks' *trueness* to their discipline was exemplary.

For the ordinary meanings of these adjectives we find suppletions in the factive system:

(33) City Council deplores the *height* (*highness*) of the new buildings.
(34) Critics acknowledge the *quality* (*goodness*) of Jean's painting.
(35) Because of its *weight* (*heaviness*) the bank vault had to be installed on the *first* floor.
(36) The landowners' extreme *wealth* (*richness*) angered the peasants.
(37) The *truth* (*trueness*) of the accusations was evident to all.
(38) The students' lack of judgment was blamed on their *youth* (*younerness*).
(39) The old woman's failing eyesight was blamed on her extreme *age* (*oldness*).

Particularly striking are those cases where suppletive parameters are used in place of morphologically regular factive nominals, even when such suppletion introduces polar lexical ambiguities:

(40) Students complained about the *size* (*bigness*) of their workload.
(41) Students complained about the *size* (*smallness*) of their stipends.
(42) The faculty deplored the *quality* (*badness*) of student work.
(43) The faculty praised the *quality* (*goodness*) of student work.
These observations suggest that the lexical items size and quality may require entry in the lexicon as nominals, since both receive S-interpretation.

(44) Students complained about the fact that their workload was so big.

(45) Students complained about the fact that their stipends were so small.

Size appears to be assigned in the lexicon as suppletion for both *bigness and *smallness (perhaps as size-ness) and quality is suppletive for *badness (or *poorness) and *goodness (as quality-ness). Both nominals may be disambiguated toward the negative pole:

(46) Students complained about the small size of their stipends.

(47) The faculty deplored the poor (low) quality of student work.

The fact that morphology supports a consistent theory of adjective polarization suggests that work in this field may contribute some insight into basic problems in semantics.

C.2 NOUNS IN -NESS AND -TH

There is another interesting argument concerning adjectives of the type we have been considering. We observed earlier that nominals are [-count]. If we examine derivatives in -ness, we find almost no cases of real derivation which permit pluralization. Business has a plural, but it is not a synchronic derivative of busy, and illness can be pluralized when it means disease. We do encounter two derivatives in -ness which exhibit plurals: thickness and weakness.

(48) The hole can be plugged by inserting several thicknesses of paper.
(49) The candidates' weaknesses were compared with their strengths. The existence of those pluralized forms can be naturally explained by our theory of lexical deep structure. Thickness in a non-nominal meaning falls into semantic analogy with breadth, width, depth, and length:

(50) This lace is available in twenty-inch breadths.

(51) It is easier to swim widths of the pool than lengths.

(52) The water was tested at various depths.

In underlying form, thickness (+count) could be represented as -th[thickA]N. This derivational function -thAN yields count nouns meaning INSTANCE DESCRIBED AS ADJ, so that a thickness is "a piece which is thick". Similarly, weakness as a count noun is underlyingly -th[weakA]N, meaning "a point which is weak" just as strength means "strong point" when it is count.

But why does this suppletion occur? Why do these forms have suppletive realization in surface structure? The answer lies in phonology. *Thickth and *weakth contain [kθ] clusters which violate morpheme-structure constraints in English. These forms do not exist because they are not pronounceable; it is "easier" to use the nominal formative as a suppletion.

C.3 DE-ADJECTIVAL NOMINALS WITH DEVERBAL MORPHOLOGY

We have observed that derived nominals may have either verbal or adjectival sources. In some cases nominals of both sorts coincide in one surface form. We have defined nominals semantically, rather than phonologically, and as Chomsky and others have observed, the morphology of nominals is quite idiosyncratic.

Among verb/nominal pairs we find extremely varied surface patterns: reside/residence, suppose/supposition, rescue/rescue, torture/torture, nominate/nomination, destroy/destruction, derive/derivation, demolish/
demolition, banish/banishment, deliver/delivery, murder/murder, inquire/inquiry, arrive/arrival, die/death, depart/departure, apply/application.

The adjective/nominal morphology is equally irregular: happy/happiness, free/freedom, sincere/sincerity, ignorant/ignorance, warm/warmth, true/truth, unstable/instability, bigamous/bigamy, idolatrous/idolatry, desperate/desperation, brief/brevity, obstinate/obstinacy, sagacious/sagacity, wise/wisdom, savage/savagery, grave/gravity, deep/depth, naïve/naïvete, determined/determination, dejected/dejection, detached/detachment.

It is important to note that some of the deverbal morphology (ending in -ment and -tion) occurs in the de-adjectival set as well, particularly in cases where the related adjective has participial phonology. For example, refinement is de-adjectival, not deverbal. The nominal of the verb refine is the gerundive refining:

(53) The refining of oil is an essential process in modern economies.

(54) *The refinement of oil is an essential process in modern economies.

Refinement is the nominal of the adjective refined, meaning "cultured":

(55) Martha's refinement was evident from her diction.

The observation that apparently deverbal nominals may actually be the derivatives of adjectives opens up some new alternative explanations to problems in syntax.

In "Remarks on Nominalization" Chomsky discusses the impossibility of the nominal constructions:

(56) *John's difficulty to please

(57) *John's certainty to win the prize

(58) *John's amusement of the children with his stories

Chomsky disqualifies (56) on the grounds that in deep structure difficult modifies sentences (not HUMAN NP's) and thus there is no underlying string
difficult to please which could be the source of difficulty to please. Eager, on the other hand, does modify HUMAN, so eager to please and eager- ness to please both occur. We may also dismiss (56) on lexical grounds, however, since difficulty is a derived noun, not a derived nominal. We have for example:

(59) One of John's difficulties was that he had no sense of perspective.

Note that difficulty is COUNT in this context. The nominal use is quite stilted:

(60) ? The problem's difficulty pleased John.

One can say:

(61) The difficulty of finding an integral solution has been underestimated.

This is a parametric rather than factive nominal use, however. Note the impossibility of *difficultness.

The construction (57) may be dismissed on the grounds that the adjective certain modifies propositions, ordinarily with that complementizers. Sentence (62) is thus not underlying:

(62) John is certain to win the prize.

Certainty is the nominal of certain, but the adjective is constrained in deep structure in such a way that the S-interpretation of (57) is blocked. To be interpretable, a that-clause must follow:

(63) John's certainty that the moon is made of green cheese

Certainty in this case is best viewed as a deverbal nominal from the underlying verb be certain, which is semantically close to the verbs suspect and be aware, both of which require that-clauses as objects:

(64) John's 

suspicion that the moon is made of green cheese awareness
Thus, for certainty we posit the entry:

(65) certainty\(_N\) : NOMINAL, from be certain

Example (58) can be disqualified in the reverse way. Rather than being a deverbal derivative of amuse\(_v\), amusement is the de-adjectival derivative of amused\(_A\). Like other de-adjectival nominals, amusement can take only one possessive NP (either as an of-phrase or as a preposed possessive determiner). Thus we have:

(66) John's amusement was evident from his laughter.

\{astonishment, happiness, delight\}

Phrase (58) does not occur for the same reason that (67) is out:

(67) *John's happiness of the children

Only one possessive NP may appear with the nominal

We do find, however, (68), as Chomsky observes:

(68) John's amusement at the children's antics

Here amusement (at) is a deverbal nominal from be amused at, which is semantically close to enjoy, delight in, be interested in. If amusement of (58) is taken as deverbal, the phrase is ungrammatical because the particle at would have to replace of, because be amused at does not take instrumental adverbs such as with stories, and because children is the wrong kind of object.

In general, be amused at takes abstract objects such as antics, remarks, behavior, naivete, talkativeness, etc. (If be amused at takes a human object, it is elliptical: John was amused at the children means John was amused at the behavior of the children.) We thus posit two lexical entries:

(69) amusement\(_N\) : NOMINAL, from amused\(_A\)

(70) amusement (at)\(_N\) : NOMINAL, from be amused at\(_V\)

Nominal (69) occurs in sentence (66), and (70) occurs in (68). Neither can occur in Chomsky's (58). Since (69) is de-adjectival, it cannot be found in
(58), because that structure contains two possessive NP's. And since (70) requires the particle at, structure (58) is again out because it contains of instead.

C.4 PSYCHOLOGICAL CAUSATIVES

Chomsky indicates [p. 191] that it may be necessary "to postulate that such sentences as John amused the children with his stories are themselves derived from an underlying structure of a different sort." He goes on to discuss a class of verbs which we shall call psychological causatives. Examples are: amaze, amuse, astonish, surprise, disgust, delight, enrage, confuse, frighten, sadden, madden, gladden, anger, interest, terrify, please, mislead, infuriate, satisfy, irritate, comfort, dismay, inhibit, convince, inspire, vex, horrify, pacify, discourage, displease, annoy, bother.

Nominal derivatives related to this class of verbs have, in general, adjectives (which often look like participles) as their morphological sources. Thus, we find the factive interpretations (72) for (71):

(71) John's extreme\text{surprise} was evident.
- delight
- anger
- astonishment

(72) It was evident that John was extremely\text{surprised}.
- delighted
- angry
- astonished

Many of these nominals, like astonishment, show deverbal morphology or violate the principle of accretion: amazed/amazement, surprised/surprise, disgusted/disgust, delighted/delight, confused/confusion, lightened/fright, sad/sadness, glad/gladness, angry/anger, interested/interest, terrified/terror, infuriated/fury, satisfied/satisfaction, irritated/irritation, comforted/comfort, dismayed/dismay, inhibited/inhibition, inspired/inspiration, vexed/vexation, horrified/horrify.
horror, displeased/displeasure, annoyed/annoyance. In general these nominals do not take a second possessive NP, as is consistent with their adjectival source: *John's amazement of Sarah, *the report's annoyance of the government, *Bill's satisfaction of Mary. (The acceptable nominal phrase Bill's satisfaction of Mary's demands is derived from the homophonous verb satisfy meaning "meet, comply with". In this meaning the verb is not a psychological causative.)

Psychological causatives have the unusual selectional restriction that subject NP's are unspecified, while objects must be HUMAN (or in some cases, ANIMATE):

(73) Martha's indignant departure amused John.
(74) Martha's smile amused John.
(75) Martha's poodle amused John.
(76) Martha's puritanism amused John.
(77) The riots in France amused John.
(78) *The rainy weather amused the rock.
(79) *Martha's poodle amused John's puritanism.
(80) *Sincerity amused democracy.

Chomsky's remark in Aspects about "the irrelevant pseudo-relation Subject-Object" [p.73] notwithstanding, it seems that in a transitive language like English, verbs can be expected to be human-unspecified:

(81) John fears sincerity
     Martha
     poodles
     rainy weather
     riots

or human-human:

(82) John helped Martha
     insulted
     murdered
     complimented
but not ordinarily unspecified-human as the psychological causatives are. It is unusual for a verb to be constrained only in its object, in other words.

This unusual variety of surface selectional restriction need not be posited in deep lexical structure if the psychological causatives are derived appropriately. We observe, for example, that sadden and gladden are derived from the adjectives sad and glad (both of which are in general the modifiers of HUMAN nouns) by the function -en_{AV}. (See section 2.2.2.) The ungrammaticality of (83) can be correlated with the ungrammaticality of (84):

(83) *The rock is sad.
   *Mud
   *Virtue
   *Democracy

(84) *John saddened
     \{the rock
     mud
     virtue
     democracy

The adjective mad applies to both people and animals, so it is not surprising to find that the verb madden takes both as objects:

(85) The dog is mad.
    Martha
    *The rock
    *Mud
    *Virtue
    *Democracy

(86) John maddened
    \{the dog
    Martha
    *the rock
    *mud
    *virtue
    *democracy

Frighten, terrify, and confuse also take ANIMATE objects, which is consistent with the ANIMATE specification of the adjectives: a frightened cat, terrified dog, confused turtle. In general, for causative verbs derived from adjectives, the object of the resultant causative is restricted in exactly the same way that the underlying adjective is restricted.
We observe, also, that the nominals of psychological causatives takes adjectives like utter and extreme: utter dismay, extreme amusement. These adjectives do not, in general, modify deverbal nominals since extremely and utterly do not modify verbs: *John married Martha extremely, *Martha is extremely married, *Martha's extreme marriage. *Peter corresponds extremely, *Peter's extreme correspondence. The reverse is true with psychological causatives: John amused Martha extremely, Martha is extremely amused, Martha's extreme amusement. Bill utterly confused Alice, Alice is utterly confused, Alice's utter confusion.

All these facts lead us to posit adjectival sources for the psychological causatives:

(87) $\text{amuse}_v$: CAUSATIVE from amused
(88) $\text{please}_v$: CAUSATIVE from pleased
(89) $\text{delight}_v$: CAUSATIVE from delighted
(90) $\text{sadden}_v$: CAUSATIVE from sad
(91) $\text{anger}_v$: CAUSATIVE from angry

It is important to observe that the principle of accretion (see 5.2) is violated by many of these entries. It seems, given the semantic evidence, that an overall analysis is still best structured in this way. The various derivatives (87)-(91) are gotten by application of allofunctions of $-\text{en}_{AV}$, whose existence is independently established. One of these allofunctions will have to delete $-\text{ed}$ in (87) - (89).
We observed in Chapter Four that -er VN is a productive derivational function that cannot be plausibly accounted for in transformational terms. We now examine the possibility of transformational analysis for two other productive suffixes, -ed NA and -less NA. These suffixes occur in examples of the following types:

(1) I saw a bearded man.
(2) I saw a beardless man.
(3) The king met with the landed nobles.
(4) The king met with the landless peasants.
(5) Helmeted soldiers marched by.
(6) Helmetless soldiers marched by.
(7) Sighted people have no trouble with this experiment.
(8) Sightless people have trouble with this experiment.

A transformationalist analysis would presumably explain these sentences by deriving them from underlying sentences containing have-clauses or prepositional phrases in with or without. Thus, (1) and (2) would come transformationally from:

(9) I saw a man with a beard.
(10) I saw a man who had a beard.
(11) I saw a man without a beard.
(12) I saw a man who did not have a beard.

In the argument which follows, we will assume that the most plausible transformational source for the above is a sentence with a have-clause. Predicative use of the noun-based adjective is hard to account for otherwise. The sentence
John is bearded.

must come from

John has a beard.

If (14) is not taken as the source, the transformation would have to apply
obligatorily in main clauses, since (15) is not grammatical:

John is with a beard.

The same argument holds for the sentence

John is beardless.

coming from the source

John does not have a beard.

since

*John is without a beard.

is ungrammatical.

And so the transformationalist treatment suggests two transformations
sensitive to have-clauses with and without Neg. We have asserted above
that the suffixes in question are productive. This does not mean, however,
that the transformations can apply unconstrainedly. If a new noun, glick,
enters English and has an appropriate meaning it may also be lexicalized
as the adjective glicked or the adjective glickless. (Marchand asserts,
[p. 324] that "-less is, formally speaking, the negative counterpart of
-ful." This was once true, but is no longer. A new adjective glickful
is unlikely in modern English.)

The (semantically limited) productivity of these suffixes does not
imply that the transformations could operate freely. We note, for example,
that the have transformation (producing -ed adjectives) requires in many
cases that an adjective modify the object noun in the structural description.
We encounter sentences like:
(19) A crooked-nosed man came to visit.

Also permissible in this frame are:

(20) long-legged, broad-shouldered, big-bellied, sharp-tongued, weak-kneed, pigeon-toed, pasty-faced, fat-headed, hairy-chested, quick-footed, long-haired, brown-eyed, red-blooded, one-armed, nimble-fingered, scatter-brained, cauliflower-eared, big-mouthed, thin-necked, sway-backed, tender-hearted.

But these forms in -ed may not occur without modifiers:

(21) *A nosed man came to visit.

(22) *A hearted man came to visit.

This means that in some cases the have transformation would apply only if the object noun is modified, since the -ed adjective cannot stand alone. Thus, sentence (23) is acceptable, but (24) is strange:

(23) John shot a blue-feathered bird.

(24) ? John shot a feathered bird.

It is apparent that this fact is basically semantic, or perhaps extra-linguistic, but not syntactic in nature. The -ed adjectives require modifiers because otherwise they convey no "new" information, since in general most men have legs, shoulders, heads, chests, etc., and most birds have feathers. Sentence (24) is strange because it is nearly tautologous, and the same is true for (21) and (22).

We cannot restrict the transformation syntactically, however, since in many other cases the -ed form does occur unmodified. In addition to the examples cited above we find:

(25) ivied walls, wooded land, winged horses, flowered wallpaper, iced tea, pebbled walk, cultured people, domed buildings, partitioned spaces.
The semantic fact in question does not simply involve body parts. We find high-ceilinged rooms, low-ceilinged rooms, and plaster-ceilinged rooms, but *ceilinged rooms is anomalous. Similarly, we find heart-shaped candy-boxes and chocolate-covered cones, while *shaped candy-boxes and *covered cones are strange.

This seems to be the same semantic fact as is evident in the following:

(26) I need some quick-drying paint.
(27) ? I need some drying paint.
(28) Anecin is a fast-acting pain reliever.
(29) ? Anacin is an acting pain reliever.
(30) The factory is conveniently located.
(31) ? The factory is located.
(32) The carefully worded statement was read.
(33) ? The worded statement was read.
(34) John's hand-written letter pleased his mother.
(35) ? John's written letter pleased his mother.

Similar examples such as theater-goer, but *goer, are cited in section 4.2.3. It appears that adverbial and adjectival modifiers are often required semantically to ensure "sufficient meaning". This includes the prefix un- as modifier, since unwanted garbage is acceptable, but *wanted children is strange.

We cannot state the adjective requirement as a transformational constraint to insure that we get (19), but not (21) or (22). Instead the semantic restrictions belong in the lexicon as rules for interpretation. Sentence (24) is out on semantic grounds, not on syntactic ones, since we can say:

(36) I saw a feathered horse.
Unfortunately, transformational analysis predicts -ed adjectives which are not, in fact, lexicalized, just as it produces -er agent nouns [see 4.2.3] which do not occur. We find the sentences:

(37) Mary has red socks.
(38) John has a blue jacket.

But we do not have:

(39) *Mary is red-socked.
(40) *John is blue-jacketed.

In general, clothes do not work like body parts. Similarly, we find carpeted rooms but not *furnitured rooms. (It may be, however, that carpeted and partitioned are the participles of denominal verbs carpet and partition rather than -ed derivatives). To block the derivation of *furnitured rooms we require rule-feature machinery at least as complicated as lexical listing, since we have to record somewhere the fact that *furnitured does not exist.

The Neg-have transformation, in contrast to that yielding -ed, would have to be constrained against modifiers of the object noun in its structural description. For example, we find

(41) Mary does not have shoes.

which might be the source for

(42) Mary is shoeless.

but we cannot derive (44) from (43):

(43) Mary does not have red shoes.
(44) *Mary is red-shoeless.

Similarly, we find (45) but not (46):

(45) George is hatless.
(46) *George is hard-hatless.
There are many derived adjectives in -less which have no counterpart in -ed or -ful, such as:

(47) odorless, helpless, sleepless, expressionless, dreamless, breathless, speechless, ceaseless, homeless, timeless, swordless, soundless, friendless, endless, childless, seedless, meatless, topless, smokeless, godless

Not all nouns can undergo Neg-have, however:

(48) This room does not have a television.
(49) *This room is televisionless.
(50) Mary does not have a dictionary.
(51) *Mary is dictionariless.
(52) John does not have an appendix.
(53) *John is appendixless.

There appear to be phonological constraints on adjectives in -less. In particular, the function tends not to apply to nouns of more than two syllables. If this constraint holds true, this fact powerfully argues against transformationalist analysis, since it is undesirable theoretically to constrain a syntactic transformational phonologically.

The lexicalist position which we have been presenting can say that the derivational functions -ed and -less, are productive phonologically (with -less generally restricted to words of three syllables or fewer) and semiproducitive semantically (neither takes proper nouns). The two functions (with -ful of meaningful an allofunction of -ed ) are semantically opposite in interpretation, but the existence of an adjective of one type does not guarantee the existence of the other: blue-feathered, *blue-featherless, homeless, *homed, *homeful.
APPENDIX E - MORE REMARKS ABOUT ZERO-DERIVATION

E.1 RELEXICALIZATION

In Chapter Three we noted that noun-underlying and verb-underlying cases of zero-derivation should be kept distinct morphologically. It is unsatisfactory to assert merely that the homophonous noun and verb are "associated" or "related" without specifying whether the noun is derived from the verb, or the verb from the noun.

Deverbal derivatives of the $\text{hiss}_V \text{N}_N$ type are distinct from the class of primitive nouns in that, for example, the derivatives are generally not concrete. Similarly, denominal verbs of the $\text{water}_N V$ type differ from primitive verbs in that the derivatives take a restricted range of instrumental objects. The verb water means TO APPLY $N$ TO, where $N$ is implicitly identical with the lexically underlying noun:

(1) John waters his plants every day (with water).
(2) Bill always salts his meat (with salt).
(3) In the summer Alice ices her coffee (with ice).
(4) Sarah spiced the gravy (with spices).

Not all nouns show such verbal forms. For my dialect the following are unacceptable (although Webster's Third gives sugar$_V$ and jam$_V$):

(5) *John milks his morning cereal.
(6) *Bill sugars his tea.
(7) *Alice fudged her icecream.
(8) *Martha whiskeyed her sour.
(9) *Johnny jammed his toast.

Denominal verbs may be relexicalized, however, dropping restrictions on instrumental nouns in deep lexical structure. For example, we find
(10) Alice buttered the wound with salve.

(11) The company bottles cola in cans.

(12) Alice bludgeoned her sister with a poker.

Here the denominal verbs butter, bottle, and bludgeon are used with nouns differing from their lexical sources—effectively, now the verbs are primitives. Another relexicalized verb is ship, which once belonged to the group truck, cart, bus, ferry meaning TO MOVE BY N. Now the verb ship has a more generalized meaning, so that we find:

(13) John shipped the trunk by train.

E.2 PROBLEMS WITH TRANSFORMATIONAL ANALYSIS

We have noted that when a verb is derived from a noun by a zero operation, the verb characteristically has a meaning which might suggest that some fundamental verb has simply been deleted from a verb phrase, as in truck from move NP by truck:

(14) Sarah trucked her vegetables into town.

(15) Sarah moved her vegetables by truck into town.

To derive (14) from (15) transformationally, we would require that an appropriate transformation be sensitive to the verb move and to the instrumental noun truck, since we do not wish to get (16) from (17):

(16) *Alex trucked Sarah's rutabaga patch.

(17) Alex destroyed Sarah's rutabaga patch with a truck.

But paradoxically, a transformation could not be sensitive to the noun truck, since we have (18) which has no such noun in deep structure:

(18) Sarah trucked her vegetables into town in the back seat of her Cadillac El Dorado.

Here the verb truck has been partially relexicalized to mean primarily MOVE,
but interpreted with truck "flavor", since in (17) Sarah's Cadillac is likened to a truck. Note also that we do not get

(19) *Sarah dump-trucked her vegetables into town.
from the sentence

(20) Sarah moved her vegetables into town by dump-truck.

This is explained lexically by noting that there is no verb dump-truck in the lexicon. The transformation would have to block modifiers in its structural description.

Interestingly, ship differs from truck in that (21) does not imply that Sarah went along, while (14) does:

(21) Sarah shipped the vegetables into town.

This follows from the relexicalization of ship in the meaning SEND rather than MOVE. It is unclear how a transformationalist treatment would handle these facts.

E.3 ELLIPSIS

Similarly perplexing problems appear with other elliptical derivational phenomena. We find, for example, many nouns derived from adjectives by the omission of particular nouns: criminalN ("criminal person"), spectacularN ("spectacular TV show"), commercialN ("commercial propaganda"), radicalN ("person with radical views"), specialN ("special TV program" or "special sale"), musicalN ("musical comedy"), revolutionaryN ("person with revolutionary goals").

In French, the derivation of nouns from adjectives by ellipsis is extremely widespread: un indigne, un fou, une folle, des enragés. In English the process is not quite so well developed. Many of the nouns derived from underlying adjectives are restricted to the plural and the definite: the poor, the rich, the sick, the wounded, the young, the aged,
the elderly, the insane. Such de-adjectival nouns must be handled within the lexicon, since if there were a syntactic transformation to effect deletion we would expect to find *the pregnant or *the liberated by striking out the plural noun women. Facts of usage of this sort should be entered as idiosyncrasies in the lexicon, since they cannot, in general, be predicted. We do not find *the happy, *the angry, *the careful, although we do find the jobless, the needy, the unemployed. The derivational function $\emptyset_{AN}$ is only semi-productive, but it seems lexically based, not transformational in nature.
APPENDIX F - DERIVATION IN OTHER LANGUAGES

In Section 5.4 we claimed that N, V, and A are major derivational categories in English, each being mapped onto the others by derivational functions. This appendix presents evidence from five other languages suggesting that this pattern is widespread, if not universal.

F.1 FINNISH

In Finnish, -inen$_A$ regularly forms adjectives from nouns, both abstract and nonabstract: ilo$_N$ "joy"/iloinen$_A$ "glad", lasi$_N$ "glass"/lasinen$_A$ "glass", puu$_N$ "tree, wood"/puinen$_A$ "wooden", kala$_N$ "fish"/kalainen$_A$ "full of fish". The function -uus$_A$ performs the reverse mapping: hyvä$_A$ "good"/hyvys$_N$ "goodness", vapa$_A$ "free"/vapaus$_N$ "freedom", kalainen$_A$ "full of fish"/kalaisuus$_N$ "abundance of fish" (in a lake).

The function -ntaa$_A(N)V$ forms causative verbs from both nouns and adjectives: suuri$_A$ "large"/suurentaa$_V$ "to enlarge", suomi$_N$ "Finland"/suomentaa$_V$ "to translate into Finnish", huono$_A$ "bad"/huonontaa$_V$ "make worse". Finnish verbs yield nouns in -us: kysy$_V$ "to ask"/kysymys$_N$ "question", vaatia$_V$ "to demand"/vaatimus "demand", ilmoittaa$_V$ "to notify"/ilmoitus$_N$ "notice, announcement,", kirjoittaa$_V$ "to write"/kirjoitus$_N$ "writing". And finally, adjectives can be derived from verbs by -va$_A$: puhua$_V$ "to speak"/puhuva$_A$ "speaking", syödä$_V$ "to eat"/syötä$_A$ "edible", lentää$_V$ "to fly"/lentävä$_A$ "flying". There are, of course, many other functions in Finnish of each type, but this brief sketch shows that Finnish has the minimal configuration of 5.4. In fact its derivational scheme is much more detailed.
F.2 SWEDISH AND GERMAN

Swedish forms adjectives from nouns by application of -ig_{A}:

fukt_{N} "dampness"/fuktig_{A} "damp", hast_{N} "haste"/hastig_{A} "hasty", synd_{N} "sin"/sindig_{A} "sinful". Nouns are derived from adjectives by -het_{AN}:

fHrdig_{A} "ready"/fHrdighet_{N} "readiness", dum_{A} "dumb, stupid"/dumhet_{N} "stupidity", farlig_{A} "dangerous"/farlighet_{N} "dangerousness".

Swedish has a function yielding verbs from adjectives which is very similar to -en_{AV} of English, except that the operator is umlaut:

glHdja_{V} "to cheer up", vHrma_{V} "to warm up," lugna_{V} "to calm down." Similar to English, too, is the derivation of verbs from nouns: fiska_{V} "to fish", krig_{N} "war"/kriga_{V} "to wage war", cykla_{V} "to ride a bicycle", tank_{N} "gas tank"/tankva_{V} "to fill up with gas", sn8a_{V} "snow", vattne_{N} "water"/vattna_{V} "to water, sprinkle." Nouns are derived from verbs by an operation similar to zero-derivation in English: pratna_{V} "to talk", jakta_{V} "to hunt", skratta_{V} "to laugh", grata_{V} "to cry", hat_{N} "hate", slakta_{V} "to slaughter", bliva_{V} "to become", tacka_{V} "to thank", tHnka_{V} "to think", se_{V} "to see", vDmen_{V} "to warm", Schnee_{N} "snow".

Since German is so similar to both English and Swedish, we will give only one example for each function: Ruhe_{N} "quiet"/ruhig_{A} "quiet", krank_{A} "sick"/Krankheit_{N} "sickness", warm_{A} "warm"/wHrmen_{V} "to warm", Schnee_{N} "snow".
"snow"/schneien_v "to snow", rufen_v "to call"/Ruf_N "call", singen_v "to sing"/singbar_A "singable". Again we find the full complement of functions.

F.3 RUSSIAN

Russian also shows functions of all six types. Nouns are derived from adjectives by -ost': glibkij_A "flexible"/glibkost'N "flexibility", absol'útnyj_A "absolute"/absol'útnost'N "absoluteness", xolódnyj_A "cold"/xolódnost'N "coldness". Adjectives are derived from nouns by -nyj NA: xólod_N "cold"/xolódnýj_A "cold", gólod_N "hunger, starvation"/golódnýj_A "hungry", t'ma_N "darkness"/t'mennyj_A "dark".

Adjectives are derived from verbs by the participial ending -nyj VA: vid6t'V "to see"/vidnyj_A "visible", obessÍlet'V "to grow weak"/obessÍlien-nyj_A "tired out", civilizovat'V "to civilize"/civilizóvannyj_A "civilized". Adjectives yield verbs by application of -et': xor6sij_A "good"/xor6sét'V "to become better looking", belyj_A "white"/belét'V "to become (appear) white," černýj_A "black"/černet'V "to become (appear) black."

Nouns are derived from verbs: osvobodít'V "to free"/osvoboždeníe_N "liberation", plavat'V "to swim"/plavanie_N "swimming", znat'V "to know"/znání_N "knowledge". Finally, verbs come from nouns by -ít': strax_N "terror"/strášít'V "to terrify", pečál_N "sadness"/pečálít'V "to sadden", gruz_N "load, weight"/gruzít'V "to load up"

The Russian derivational system is so complete it is often hard to say which formative is underlying. For example, we find naxál_N "an impudent person (male)", naxálka "an impudent person (female)", naxál'pyj_A "impudent", naxál'stvo_N "impudence", naxál'níčat'V "to be impudent." Semantically, it seems most likely that the adjective is
underlying, although it is longer than the noun naxál. If so, we have an apparent violation of the principle of accretion [Section 5.2].

F.4 FRENCH

Abstract nouns can be derived from French adjectives: gentil_A "nice"/gentillesse_N "niceness", petit_A "small"/petitesse_N "smallness", fin_A "fine"/finesse_N "fineness". Adjectives are formed from nouns: fleur_N "flower"/fliuré_A "flowered", poisson_N "fish"/poissonsux_A "abounding in fish", barbe_N "beard"/barbu_A "bearded".

Verbs are derived from nouns: flamme_N "flame"/enflammer "to enflame", fleur_N "flower"/fleurir_V "to flower", graisse_N "grease"/engraisser_V "to fatten". Verbs also come from adjectives: rose_A "pink"/roser_V "to make pink", noir_A "black"/noircir_V "to blacken", gros_A "big"/engrossir "to be pregnant".

Nouns are derived from verbs: chanter_V "to sing"/chant_N "song", chasser_V "to hunt"/chasse_N "hunt", choisir_V "to choose"/choix_N "choice". (In these cases we again find violations of the principle of accretion.) Finally, we have adjectives from verbs: défendre_V "to defend"/défendable_A "defensible", connaître_V "to know"/connaissable_A "recognizable", comprendre_V "to understand"/compréhensible_A "understandable".

Thus, French also shows derivations of each of the six types.
FOOTNOTES


2. Note also that *bi-weekly* has two meanings, *bi[week-ly]* "twice a week" and *[bi-week]-ly* "every two weeks"

3. The lexicon must record each morpheme of the language, and many of the words. In the case of *sing*, the ablaut forms of the verb must also be stored, since they are not predictable. Halle (1973) observes that "there is every reason to expect that paradigms must appear as entities in their own right somewhere in a grammar. If my proposal is correct one such place would be the dictionary, from which the lexical insertion transformations draw items for insertion into a sentence." [p.9] Siegel (1974) discusses in some detail the lexical representation of formatives, distinguishing four principal classes: (1) formatives which happen to be words, (2) stems, (3) suffixes, and (4) prefixes. [p.104] A case of a word which does not need to be listed in the lexicon is *walked*, the past participle of *walk*. It is regularly formed and its existence is guaranteed by the general fact that all English main verbs have such participles. *Sung* must be listed, since its form does not follow the general pattern.

4. Paul Kiparsky has pointed out that historical evidence for this claim is the fact that the adjectives are retained in their old form when the participles are regularized analogically, e.g., *gilt/gilded*, *burnt/burned*, showing that they are separate lexical entries. See Kiparsky, "Remarks on analogical change," *Proceedings of the First International Conference on Historical Linguistics*, North Holland Press, 1974.

5. The *Greening of America* was a cleverly chosen book title for precisely the reason that *green* does not exist, and thus the title evokes surprise.
6. Analogies are intended as diagnostic contexts, not as theoretical additions
to the grammar. The lexicon does not contain analogies, but they are used
in its compilation.

7. This tree, and the others like it in subsequent discussion, is not to be
taken as a syntactic derivative, but rather represents a structure which
has semantic interpretation analogous to that of the noun under discussion.
See section 2.2.1.3 for clarification.

8. Barbara Partee (personal communication) has suggested some ways of formu-
ulating these relationships in terms of meaning-postulates.

9. See James H. Rose, "Principled Limitations on Productivity in Denominal
Verbs" on this point.

10. Actually, it should be *John is the robber of things. The problem of
articles must also be dealt with.

11. This argument depends upon the entirely reasonable assumption that trans-
formational rules should be more "regular" than lexical rules.

12. Kiparsky has pointed out to me that this phonological evidence is con-
tradicted by the pair relieve\(_v\)/relief\(_n\), where the noun presumably comes
from the verb. The noun is abstract, however, so a different process
may be operative here, since we also find believe\(_v\)/belief\(_n\), and grieve\(_v\)/
grief\(_n\). Following the concrete pattern are calf\(_n\)/calve\(_v\), shelf\(_n\)/shelf\(_v\),
half\(_n\)/halve\(_v\). The noun dwarf does not voice when made into a verb.

13. Some subtle problems remain, such as the choice of determiner. Note that
we could also have John is the inventor of gizmos.)

14. Again, there are problems with determiners.

15. Observe that in a few cases both functions apply: refrigerator and
refrigerant, cooler and coolant, polluter and pollutant, propeller and
propellant.
16. See section 3.3. Note that these prefixes are not to be confused with the semantically distinct un- applying strictly to nouns: Unmensch, Untier, etc. The noun Untiefe, interestingly, is ambiguous, meaning "very deep place" where the "awful" un- applies, and "shallow place" where the "not" un-A applies.

17. Kiparsky has suggested the possibility that thieve is morphologically derived from thief, but semantically underlying. In general in this work we have assumed that such crossing of relations is not the case.

18. Use of the adjective paradigm for these adverbs is somewhat similar to the use of the genitive to form animate masculine accusatives in Russian; paradigmatic substitution seems to occur fairly frequently.

19. These examples, frivolously intended, are from Emily Pope.

20. Compounding works quite differently from suffixation. Adverbs and nominals are certainly not terminal for compounding. For example, we find soft-spoken, hard-pressed, self-contemplation, self-denial.
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BIOGRAPHICAL NOTE

The author was born in Lakewood, Ohio, on March 6, 1945. He lived in Rochester, Cleveland, and Portsmouth, Ohio, during elementary school years. He graduated from Talawanda High School in Oxford, Ohio, in 1963. He attended Swarthmore College on a National Merit Scholarship, receiving the B.A. degree in Russian Literature, "With Distinction" and Phi Beta Kappa, in 1967. During the spring of 1967 he studied Finnish at Helsingin Yliopisto in Helsinki. He began graduate study in the Linguistics Department at MIT in the fall of 1967, with Woodrow Wilson and Danforth Graduate Fellowships. He left MIT to become Assistant Professor of Linguistics at the newly founded Hampshire College in Amherst, Massachusetts, in the summer of 1970, just after the American invasion of Cambodia. His teaching at Hampshire was interrupted by a nervous breakdown and subsequent hospitalization in the fall of 1972. Now recovered and teaching again, his interests--besides morphology--include international affairs and peace work. He has made many trips to the Nordic countries and the Soviet Union.