Phonological Constraints in Syntactic Descriptions
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0. Introduction.

Work in generative grammar has proceeded on two assumptions about the relationship between the syntactic and phonological components of a grammar: (a) strictly phonological information is never required for the operation of the syntactic component; (b) the syntactic information that may be required for the operation of the phonological component is limited to certain (not all) types of information available in superficial syntactic structure.¹ I shall call the first of these working hypotheses the principle of phonology-free syntax, the second the principle of superficial constraints in phonology. These are strongly restrictive assumptions about the range of possible grammars for natural languages. They are therefore valuable elements within the theoretical framework of generative grammar, if they can be maintained. If neither principle can be maintained in its strongest form, it becomes an important line of research to determine what are the strongest versions of the principles that are consistent with known phenomena in natural languages; the least satisfactory state of affairs, from a theoretical viewpoint, would be the complete interpenetration of all components of a grammar.

In what follows I shall review some facts of English apparently inconsistent with a strong form of the principle of phonology-free
syntax, with the intent of showing that in these cases the influence of phonology upon syntax is indirect. The fact that a few apparent counterexamples disappear upon careful reanalysis does not, of course, provide very strong support for the principle of phonology-free syntax (indeed, various investigators have mentioned to me possible further counterexamples in an assortment of languages), but it does indicate the need for attempts to refine and revise the principle and test its validity over a wide range of data.

The principle of superficial constraints in phonology cannot be maintained in anything like its strongest form; for a discussion of the principle see Zwicky (to appear) and the references cited there (and now also Zimmer 1969).

To return to the question of phonological constraints in syntax: in standard accounts of the overall configuration of a grammar (e.g. Chomsky 1965) it is assumed that lexical items are inserted in structures at an early stage in derivations, and that these lexical items are composites of at least three types of information about the idiosyncracies of the forms: semantic, syntactic, and phonological. It is also assumed that of these only the syntactic markings (indications of constituent types like S, NP, and VP, of categories like NOUN and VERB, and of features like [± feminine] and [± animate]) can be referred to in syntactic rules. Note that because the phonological information is carried along during the operation of the syntactic component, the restriction to syntactic markings must be an explicit condition on the form of transformational rules. A similar explicit condition is required to limit the extent of reference to rule-features (in the sense of Lakoff 1965), which are carried along as specifications
of the applicability of rules to specific lexical items.

Some care is needed, however, if the principle of phonology-free syntax is not always to be satisfiable in a trivial way, through the exercise of formal ingenuity. Imagine a language with an optional rule that places a time adverbial at the beginning of its clause. Suppose further that this rule is inapplicable if the first consonant in the head word of the adverbial is [b]. Although such a situation would appear to constitute a straightforward violation of the principle of phonology-free syntax, it can nevertheless be made to conform to the principle, in the following way: each form to which the preposing rule is inapplicable is marked as an exception to the rule, and the (syntactic) exception-feature is then used to condition a phonological rule 'redundantly specifying' the first consonant of the form as [b]. The first line of attack on this 'solution' is to suppose (quite plausibly) that among the clauses of the principle of superficial constraints in phonology is one disallowing syntactic exception-features as conditioning factors for phonological rules. This obstacle can be surmounted by giving the exception-feature a name not of the form ' ± Rule n '; it is then merely fortuitous that the feature is mentioned in but one transformational rule. The appropriate counter-move is to require that there be independent motivation for the postulation of true (non-exception) syntactic features. The imaginary adverbial preposing rule finally admits of no analysis not in violation of one principle or the other—unless, of course, the Gedankensprache bizarre enough to have the preposing rule has a second rule conditioned in some way by words with [b] as their first consonant, in which case there is independent motivation for a 'true' syntactic feature.
Clearly, what is required here is a substantive theory of syntactic features (perhaps, as suggested in Zwicky 1968, one assimilated to a theory of semantic features; see also the epilogue to Perlmutter 1968). In the absence of such a theory I shall approach the examples in this section in the spirit, rather than by the letter, of the principle of phonology-free syntax as first stated.

1. Inflectional versus Periphrastic Comparatives and Superlatives.

The classification of adjectives and adverbs according to whether they have an inflectional comparative and superlative (happy, happier, happiest) or the periphrastic equivalents of these formations (active, more active, most active) is a rather complex matter, determined sometimes by syntactic considerations (constructions of the type He is more happy than inspired, roughly equivalent in sense to It would be more appropriate to say of him that he is happy than it would be to say of him that he is inspired, require the periphrastic forms; similarly 'absolute superlatives' like I am most proud, roughly equivalent to I am very proud), partly by style (curiouser is jocular, and distinctly learned words like abstruse require the periphrastic forms), to some extent arbitrarily (pleasanter but more ardent), and in some cases on the basis of phonological form. The facts are well known, and their explanation refers partly to number of syllables and partly to segmental phonology. For example, words with two or more syllables (active, awful, intelligent, abrupt, exact) normally have periphrastic forms, except in the case of disyllabic words with certain endings (e.g. -le in noble, -or in tender, -ow in yellow, -y in happy) or with tense vowels in their final syllables (polite, profound, sincere, obscure).
It might be supposed that the choice between an inflectional formation and a periphrastic formation can be made within the phonological component (subject, in certain circumstances, to syntactic markings). However, there are several syntactic processes which must be sensitive to the difference between the two formations: for example, in most modern dialects of English, Conjunction Reduction applies only to the periphrastic versions, so that She is the most beautiful, intelligent, and receptive woman I've ever met (=She is the most beautiful, most intelligent, and most receptive woman I've ever met) contrasts with She is the prettiest, smartest, and friendliest woman I've ever met and She is the most beautiful, smart, and friendly woman I've ever met. The generalization is that Conjunction Reduction (throughout English and probably other languages as well) does not normally apply to proper parts of words, so that if this generalization is to be applicable, the inflectional and periphrastic formations must be distinguished at the point in derivations at which the process of conjunction reduction applies to comparatives and superlatives.5

Another syntactic rule that must be sensitive to the distinction between the inflectional and periphrastic formations is Reduplication, which generates continuative expressions of the type Maggie sobbed and sobbed and sobbed (Browne ms. 1964, summarized in Lakoff and Peters 1966). Although some adjectives may occur in either form (The drunk got noisier and noisier and noisier or The drunk got more and more and more noisy), the two types of comparatives cannot be mixed (*The drunk got more and more noisy and noisier).
It seems clear that the inflectional forms are derived from the periphrastic forms, by means of a rule I shall call Adjectival Inflection (but the following discussion does not depend on the direction of derivation, nor on the details of the rule). It is this rule, then, and not Conjunction Reduction or Reduplication, that must apparently be sensitive to phonological information. But there is no reason to suppose that the rule itself mentions phonological features, any more than there is reason to suppose that the rule itself mentions specific lexical items that eccentrically fail to undergo or eccentrically do undergo the rule. Rather it is the case that the distribution of the rule-feature [± Adjectival Inflection] in the lexicon is partially determined by phonological considerations, just as the 'lexical redundancy rules' discussed by Chomsky and Halle (1968:175 and elsewhere), predict, on the basis of underlying phonological form, the applicability of certain phonological rules to lexical items.

It seems to be a fairly common phenomenon that syntactic features are predictable from aspects of underlying phonology. Consider, for example, the English words ending in -a (usually representing the phonetic [æ] and an underlying lax low vowel). There is an enormous number of such words—on the order of a thousand, to judge from the entries in Walker (1936). Of these, only a handful have uses as verbs (subpoena and all names of dances ending in -a, regardless of their national origin: hula, polka, mazurka, rhumba, samba, conga) and even fewer as adjectives (extra). There is, in general, no justification for identifying the final -a as a separate morpheme (as there might be for the final -a of first-declension nouns in Latin). Hence, from the fact that a lexical item ends in a lax low vowel one can predict, with
the exceptions already noted and a few others, that the item is a noun and that it does not participate in processes converting nouns to verbs (as in butcher, mother, knee, knife). The only barrier to a lexical treatment of the phonological restrictions on Adjectival Inflection is the possibility that stress, rather than number of syllables, might be a contributing factor. Jespersen's statement (1949:350) is that 'adjectives of more than one syllable with end-stress generally take -er and -est', but he must then go on to make exceptions of all end-stressed disyllables ending in consonant clusters (correct, distinct, absurd, robust, corrupt, etc.), so that the only disyllables remaining are those with tense vowels (including profound, which has a cluster, but also a tense vowel).

Moreover, many of the disyllabic adjectives that Jespersen (similarly Kruisinga) must list as exceptionally taking -er and -est are monosyllables in their underlying representations. The items in question are those ending in phonetic [r ! n] and having no vowel preceding the /r ! n/ in their underlying representations: tender, bitter, clever (cf. vulgar, which ends in underlying /ər/ and has periphrastic formations), able, gentle, humble, noble (cf. royal, which ends in underlying /əl/ and has periphrastic formations), often, rotten, and many similar items.

There are two further classes of disyllabic adjectives which regularly have inflectional formations: those ending in -ow (narrow, shallow, hollow) and -y (early, happy, surly, ugly). The -y class presents difficulties in Jespersen's account, because he must distinguish
the endings -y (either part of the root, as in the examples just cited, or constituting the adjective-forming suffix in flashy, lucky, pushy, powdery, and meaty, but not in rickety, raggedy, and like forms) from -ly (the adverbial suffix in truly, purely, easily, quickly), because the latter suffix normally requires the periphrastic formations (*quickliest, *trulier; cf. surliest, ugliest), as do adjectives with the suffixes -ing (*charmingest, *pleasingest), -ive (*activest), -ish (*foolishest), -ic (*tragicest), -id (*vividest), and the past participle -ed (*devotedest)—but not the -ed of crooked, ragged, rugged, wicked, tired, wretched.

Some sense can be made of these facts if we assume that Adjectival Inflection is a minor rule (see Lakoff 1965) with its applicability to certain forms (e.g. solid, stupid, pleasant, quiet, handsome, cruel) marked on those forms in the lexicon and with its applicability to several classes of forms predicted by principles referring to underlying representations. The applicability of Adjectival Inflection then depends upon the marking on the last morpheme in an adjective, so that an adjective with a suffix does not undergo the rule unless the suffix is marked [* +Adjectival Inflection *]. The general principles are: (a) underlying monosyllables are [* +Adjectival Inflection ]; (b) so are underlying disyllables with a tense vowel in the final syllable; (c) so are underlying disyllables ending in a lax vowel (this covers the cases of -ow and non-suffixal -y, which come from underlying /ɔ/ and /ʌ/, the other lax vowels either don't occur finally in adjectives or are deleted, yielding monosyllables—see Chomsky and Halle 1968 for details); (d) so are the suffix -y and one of the -ed suffixes (but no
other suffixes). Note that cases (a) and (b) have final stress, (c) and (d) normally penultimate stress.

2. **Inflectional and Periphrastic Genitives.**

The formation of the inflectional genitive plural of nouns is governed by the following principles. (1) For nouns which have regular nominative plurals (in $S = [s, z, ız]$, whether the noun itself shows final voicing, as in *wives*, or not, as in *cuffs*) the genitive plural is identical to the nominative plural. (2) For nouns with no change in the nominative plural (*sheep*, *fish*, *snipe*, etc.) the genitive plural ends in $S$. (3) Nouns with truly irregular plurals fall into two classes: (a) those with a genitive plural in $S$ (*The oxen's necks were neatly severed, The foci's location was easy to determine, The addenda's length was unacceptable, The men's ties were all green, The formulae's having six errors was astonishing, The women's feet were dirty, The seraphim's faces were truly angelic, The children's eyes were closed, The virtuosi's music fell from their hands); (b) those with no inflectional genitive plural at all (*I was astonished at his feet's size, The geese's necks were neatly severed, The mice's having no tails amused me, These teeth's extraction will take hours, The lice's bites itched like crazy). The distinction between types (a) and (b) is simply the distinction between nouns with plurals ending in sonorants (regardless of the form of the singular--note *ox*, *focus*, *child*) and those with plurals ending in obstruents. It should be pointed out, however, that the listing *feet, geese, mice, teeth, lice* is exhaustive, so that the evidence for the generalization is not overwhelming.
Some of the examples cited above involve the rule Genitive Preposing, which turns postnominal of-constructions into inflected prenominal modifiers (perhaps through an intermediate stage in which the postnominal phrase is inflected, as in a friend of the mouse's). This rule is subject to various odd, but probably not phonological, constraints, among them: (a) for many speakers, the rule is restricted in its applicability to inanimate nouns (?the table's legs); (b) there are restrictions on the length and complexity of the preposed noun phrase (the queen of England's reign but *the sister of the most recent queen of England's reign); (c) plural noun phrases can be preposed only if they end in their head nouns (*the queens of England's reigns, *the men I mentioned's golf scores, *both of us'/ours' friend; cf. all of England's most recent queens' reigns, the men I mentioned's golf scores, both men's friends);¹⁰ (d) only certain senses of of permit the preposing (partitives, as in the bucket of water, are well-known exceptions; *water's bucket); (e) within definite NPs, the preposing is obligatory for certain noun phrases, roughly those that are both animate and short (*the pen of my aunt, *the pen of my aunt's, versus my aunt's pen, the charm of my aunt, the pen of my paternal grandfather's second wife, a pen of my aunt's), so long as the head noun has no relative clause (the pen of my aunt which was stolen from her last week). Oddities (b) and (e) are discussed briefly in section 7.2 below.

Not all of the earlier examples involve Genitive Preposing. The construction in the formulae's having six errors and *the mice's having no tails, for example, does not have an intermediate periphrastic
stage in its derivation. The phonological restriction is operative here and also in postnominal constructions like a friend of the mouse's (cf. a friend of the mice's). It is natural to suppose that a feature [+genitive] is associated with NPs in a number of ways and that the phonological restriction constrains a rule (call it Genitive Inflection) that realizes the feature as a suffix.\(^\text{11}\) Oddity (c) of the previous paragraph is similarly associated with Genitive Inflection rather than with Genitive Preposing.

I turn now to the question of whether the phonological restriction is a condition on Genitive Inflection or whether, like the phonological conditions on Adjectival Inflection in the previous section, it can plausibly be treated as a phonological determinant of rule-features associated with lexical items. The lexical treatment requires an extension of the devices for predicting lexical exceptions (but see Lakoff 1965 for some related notations), because the restriction applies only in the plural (my foot's size, the goose's neck, etc. are impeccable genitives). Instead of a condition of the form 'any lexical item with syntactic properties \(f_1, f_2, \ldots, f_m\) and with phonological properties \(g_1, g_2, \ldots, g_n\) has the feature: a Rule \(k'\), the condition must assume the form 'any lexical item with syntactic properties \(f_1, f_2, \ldots, f_m\) and with phonological properties \(g_1, g_2, \ldots, g_n\) has the feature: \(h_1 \land h_2 \land \ldots \land h_p \supset a \text{ Rule } k'\), where the implicational clause is to be read as 'if the item has the features \(h_1, h_2, \ldots, h_p\) when the applicability of Rule \(k\) is being tested, then the item also has the feature: a Rule \(k\). In the present case the lexical condition would be, very roughly, that any lexical NOUN with the feature
[ +irregular ] and with a final [ +obstruent ] segment has the feature: [ +plural ] C [ -Genitive Inflection ]. Note that the need for the implicational feature does not depend upon the reference to phonological information; if tooth, foot, etc. were simply marked as exceptions in the lexicon, the exception-feature would still have to be implicational.

3. Inchoatives and Causatives.

These verbs (see Lakoff 1965, chapter IV) may be (a) identical to the verb or adjective upon which they are formed (burn, dirty, cool, warm), or identical except for a vowel change (heat); (b) formed with the prefix en- (enfeeble, enlarge, embitter); (c) formed with the suffix -ify (solidify, purify); (d) in suppletive relationship with another verb (kill-die); (e) formed with the suffix -en (moisten, thicken). The assignment of forms to these categories is largely arbitrary, and many verbs and adjectives have no corresponding single-word inchoative or causative (e.g. cold, furious). That is, the treatment of any particular verb or adjective is a matter of lexical marking.

One instance in which the assignment is not arbitrary is the suffix -en, which occurs only after monosyllabic roots ending in an obstruent. As Jespersen (1942:355) observes, 'there are no examples of n-vbs formed from adjs in vowels (or diphthongs): free, blue, low, slow, high, sly, shy, new; narrow, yellow, steady, holy; nor of such disyllables as able, noble, nor of adjs in m, n, q, r: slim, thin, brown, clean, long, strong; far, poor, near'. His two examples in [1] are nineteenth-century nonce-words, dullen and palen. Other
formations in -en, e.g. the participial ending, are not subject to
the restrictions.

I shall not develop here the formal devices to express generaliza-
tions such as 'inchoatives and causatives in -en can be formed only
on monosyllabic stems ending in obstruents'. It is sufficient to note
that the required devices are extensions of the formalism given in the
previous section for expressing associations between aspects of
phonological representations and rule-features.

There are only about forty inchoatives or causatives in -en
(further examples: dampen, brighten, harden, blacken, deafen, loosen,
freshen, lengthen), and the formation is not particularly productive
in current English, so that it is not impossible—merely unlikely—
that the correlation with phonological features is accidental.


Perlmutter (1968, Part Two) provides convincing, detailed
arguments that two linguistic phenomena must be accounted for not by
rules or conditions on rules, but by conditions on surface structures:
the order of object pronouns in Spanish, and the requirement in French
and English that non-imperative sentences have a surface subject. The
latter constraint refers only to the configurations appearing in
surface structure and not to the phonological character of the items
there, and hence need not concern us further here. Other examples of
this type are the requirement in English (and German) that pronominal
direct objects must precede indirect objects (see footnote 33 above),
the prohibition against double occurrences of even within a single
clause (James McCawley has pointed out to me that sentences like
De Gaulle is urging that we give back even Portugal to Spain, and now
even Franco is doing so require double occurrences of even at an intermediate stage of derivation), and the well-known restrictions on the ordering of prenominal adjectives (see, e.g. Vendler 1968, Part Two).

The situation with Spanish pronouns is somewhat different. Here the condition is that if there are two object pronouns they must be ordered according to the scheme se II I III. Moreover, the condition is applicable regardless of the origin of se, and Perlmutter argues that at least three distinct sources must be posited for se (reflexive, impersonal, and 'spurious'). He observes further that 'the amount of phonological information to which [the constraint] is sensitive is extremely restricted; it seems to be confined to the phonological shape of morphemes, and certainly does not extend to phonological features of segments'(187). It is not transparent, however, that a reference to phonological shape is actually required in the statement of the constraint, the question being whether or not there are (independently motivated) syntactic features common to these occurrences of se and distinguishing them from other Spanish morphemes. If there are such features, then the constraint can refer to them instead of to the phonological shape se, just as the constraint refers to features of person instead of to the phonological shapes of the pronouns me, te, le, la, nos, etc.

Note that a reference to the phonological shape se is always eliminable by ad hoc means, namely by the introduction of a special feature f in every rule that creates occurrences of se. The suggestion of the previous paragraph is that there might be some
motivation for $f$, that the appearance of $se$ as a reflexive pronoun, as an impersonal pronoun, and as a replacement (via the 'spurious $se$' rule) for a third-person dative pronoun when that pronoun immediately precedes a third-person accusative pronoun, might not be accidental, either because of further facts of Spanish or because of considerations of universal grammar (certainly a connection between impersonals and reflexives is widespread). I do not have serious evidence bearing on the matter, but I would point out that the reference to several varieties of $se$ in Spanish seems natural in a way that a similar reference to several varieties of [tuw] in English would not--yet Perlmutter's statement of the constraint treats the three varieties of $se$ as fortuitous homophones.

Related to the issue of whether $se$ is a single item or not are a variety of problems concerning the lexical, syntactic, and phonological identity of items, among them the following: (a) as Fillmore (1968) observes, different senses of one lexical item (and homophonous lexical items) must be distinguished from true disjunctions in a single sense of a lexical item (Fillmore's example: the collection of senses of bachelor is different from the disjunctive sense of brother-in-law, because He is not a bachelor asserts that he lacks only one type of bachelorhood, whichever one is appropriate to the context in which the sentence is uttered, whereas He is not my brother-in-law asserts that he is neither my sister's husband nor my wife's brother); (b) the subparts of idioms must usually be identified with other lexical items, if various morphological and phonological peculiarities of these subparts are to be explained (thus, the verbs in beat around the bush,
have recourse to, blow off steam, fall heir to, and do away with have
the irregularities of these verbs in non-idiomatic uses\(^{13}\)); but (c)
idiomatic uses of items must be distinguished from non-idiomatic uses,
and different uses from each other in general, if a coherent account
is to be provided for the failure of conjunction reduction to apply to
constructions of similar structure but different sense ("He kept tabs
on her and bloodhounds in the garage, *I have a big house in Mamaroneck
and a dreadful pain in my left thumb\);\(^{14}\) (d) the appearance of an item
having several distinct functions (e.g. the 'empty' do and the do
associated with activity verbs, both appearing in What he did do was
open the window) in several different contexts in underlying structures
does not explain the convergence of form, any more than would the
creation of the item as the product of several different rules.

Another English constraint that might require reference to phonolo-
gical shapes, among other things, is a prohibition against identical
conjunctions\(^{15}\) (whether logically redundant, as in *I and I like spaghetti,
or not, as in *I and I sang and danced, respectively), even when the
identity is syntactic but not phonological (*Jack and Jill dreamed and
dreamt, respectively), and perhaps even when it is only phonological
(*Jackie and Jacquie kissed passionately, *Bill and the frog croaked
['died'] and croaked ['rivet'], respectively, *Bill croaked [like a
frog] and croaked [died], *Bill [Jones] and Bill [Smith] both can
play the viola). There are a number of difficulties in stating the
constraint,\(^{16}\) not the least of which is the relative acceptability of
the examples where the identity is purely phonological. The oddness
of these examples could result as easily from difficulties in comprehending
them as from purely grammatical considerations.

A final set of cases in which reference to phonological shapes might be needed consists of restrictions referring to sequences of identical forms, especially when unstressed. Some sequences of identical forms are tolerated (The children are all all covered with chocolate, The bulletin came in in the newsroom, The ones I have have no lids, I knew that that would happen), others are reduced (many speakers replace had had by had regularly), others are never generated (*and and, *your your), and some are rejected if generated. I have but one fairly clear example of this last type in English, and it turns out to refer not to specific items but to classes of forms.

Consider sentences like Are you THE Dr. Spock?, I grew up in THE Bayonne, not Bayonne, Louisiana, And when he speaks of Irene Adler, it is always under the honourable title of THE woman, and He's not just any old algebraic topologist, he's THE algebraic topologist; also He's the Dr. Spock I mentioned to you and Is that the Bayonne George grew up in?; also There's a Dr. Spock who lives near us, I once visited a Bayonne, Four Louisas is too many for any class. Without going into the details here, it seems clear that proper names that are normally without articles may occur in certain contexts with articles, and under further conditions the definite article may receive heavy stress. Now observe that there are proper names like the Hague and the Ginza, in which the definite article always appears. Some speakers cannot use such names in the constructions just described: *Is this THE (the) Hague?, *This is the (the) Hague I mentioned to you, *There's only one (the) Hague. Other speakers
accept the single-article versions (*THE Hague, etc.*) but not the double-article ones (*THE the Hague, etc.*). The latter speakers presumably have a rule replacing the inherent article of the proper name by the article appropriate to the construction, and adding an article to those proper names not already having one. One way of accounting for the judgments of the former speakers is to say that the article appropriate to the construction is inserted in front of the proper name, *the Hague* already having an article of its own, and that there is a surface structure constraint rejecting *the* and other sequences of articles. Note that the constraint in this dialect (which is mine) refers not to *the* but to the class of articles.

In summary, the evidence for reference to phonology, even only to the phonological shapes of morphemes, in English surface structure constraints is quite slim (although a special class of examples of this type will be discussed in the next section). In a way this is surprising, for surface structure constraints are the very latest of the late syntactic rules. If no phonological information were required for their proper application, then the borderline between morphology-syntax and phonology would be a good bit sharper than appears from a superficial consideration of the phenomena I have been discussing. It is quite likely that a close study of other languages will uncover a number of surface structure constraints which are correctly formulated in terms of phonological shapes of morphemes; one expects to find, for instance, agglutinative languages in which the ordering of morphemes is partially determined by syllable structure, and perhaps even by aspects of segmental phonology.
5. Stress Phenomena.

Before returning to examples in which the phonological conditioning of syntactic processes proves to be indirect, I must mention one further class of cases in which it seems certain that phonological markings influence syntactic processes, namely rules or constraints that depend upon stress levels. This class is probably large (it includes at least pronominalization), the facts have not been thoroughly examined, and the interpretation of the facts that have been discussed is complex and controversial (compare the approaches in Chomsky ms. 1968 and Lakoff ms. 1968). I have little to add here to these discussions and wish only to note that there are situations in which the primacy of the phonological markings is clear, regardless of how this primacy is interpreted.

Consider, for example, the observation that the antecedent of a pronoun must be (relatively) unstressed. Examples due to Perlmutter are When he entered the room, Mary kissed John, in which he can refer to John, versus When he entered the room, Mary kissed John, in which it cannot. Lakoff presents evidence tending to show that phonetic stress reduction rules, not just stress levels that might conceivably be associated with some special marker of emphasis or contrast, are implicated; he contrasts examples like Mary hit him, before John left, in which him cannot refer to John because John bears secondary stress, with examples like Mary hit him, before John left in his Rolls Royce for a dinner engagement at the Ritz, in which him can refer to John, the NP John bearing reduced stress because of the length and complexity of the following VP. Lakoff proposes a surface structure constraint
referring to stress levels. An account along the lines suggested by Chomsky and by Jackendoff (ms. 1968) would take the stress levels on certain phrases as determining which of various possible semantic interpretations can be associated with those phrases. In either account the stress levels are a determining factor, although in the latter account what is determined is not the applicability of a rule or the well-formedness of a structure, but rather the association of semantic readings with sentences.

6. The GO FISH Construction.

6.0. Introduction.

The construction exemplified in imperatives like Go look at him! and Come see the snow fall! has a most peculiarly restricted distribution. It occurs in the imperative, as already noted, in the 'simple present' in the first and second persons and in the third person plural (I/we/you/they go observe the stars whenever there's an opportunity), in infinitive constructions (He wants (us) to go hunt for his etchings), in constructions with do and the modals (He did/will/can/might come speak to us), and in present subjunctive constructions (I insist that he go watch the game). It does not occur in the third person singular 'simple present' (*She go(es) observe(s) the stars whenever there's an opportunity, *The cat come(s) glare(s) at us when we don't give her Alpo), in the simple past (*I/they/Geoffrey went play(ed) in all the concerts, *I/they/Gregory go looked at it; but cf. Did they go look at it?), in any -ing form, whether progressive or nominalization (*I am always going talking to you, *Coming watch(ing) the stars is fun), in any perfect tense (*I have gone race(d) down the street), or in passives (cf. Who did he go see? with *Who was go(ne)
seen by him?). The generalization apparently is that the construction is possible only when the required form of go/come is identical to the infinitival form go/come. That is, the description of the construction appears to refer to phonological identity.

In fact, the restriction is somewhat more extensive, because the verbal form following go/come must also be identical to its infinitive. For all verbs except be this condition is satisfied by the operation of independent principles: first go/come and the following verb must have identical affixes (this follows from the derivation suggested in the next section); and second, only be fails to have its present tense forms (excluding the third singular) identical to its infinitive. But the facts for be force the condition to be stated for the second verb as well as the first: *Whenever Eloise wants it, I/we/you/they go am/are sweet to her, versus If Eloise wants it, I/we/you/they will go be sweet to her, I insist that you go be their king, etc.

Note the contrast between this construction and the superficially similar construction in Let’s go swimming! and Margaret will come walking with us, which is not restricted to forms of go and come identical to the infinitive (The mayor went fishing, Margaret comes strolling with us almost every day) and which, moreover, has a rather different meaning, as indicated by the restriction of the latter construction, but not the former, to a small class of activity verbs (Go be quiet!, *Go being quiet!, She will come live with me, *She will come living with me, You should go talk to Halle, *You should go talking to Halle).
The *go swimming* construction must itself be distinguished from a participial construction modifying the subject: I came playing the bagpipes and left wearing only my kilt (= I played the bagpipes when/while I came and wore only my kilt when/while I left), I went (, feeling miserable, She entered the room radiating happiness. This construction is not limited to *go* and *come* as the first verb, nor to activity verbs as the second; when *go* and *come* do occur, they have the sense of motion verbs, as opposed to their semantic 'weightlessness' in *Let's go fishing* (= *Let's engage in fishing, or Let's fish*) and *Come hunting with me* (= *Engage in hunting with me, or Hunt with me*); the participial phrase is movable (*Radiating happiness, he entered the room, versus Swimming, she went, the latter not a paraphrase of She went swimming*); and past as well as present participles appear in the construction (*I came surrounded by admirers and left hunted by the police*).

A similar construction, restricted to *go* and *come* as the first verb and motion verbs as the second is, perhaps, a special case of this participial construction: Harry came racing (wildly) across the field (= *Racing (wildly), Harry came across the field*), Henry went swimming to the end of the channel (= *(By) swimming, Henry went to the end of the channel*). Compare Harry came walking with us (≠ *(By) walking, Harry came with us), because here there is no assurance that we too are walking).


The *Go/come look at him!* construction is probably to be derived as a reduction of the construction *Go/come and look at him!*, the two
being paraphrases (to the extent that the absence of true motion in
I'll go solve the problem is mirrored in I'll go and solve the problem;
similarly, Did you have to go (and) wreck my ideas?). The coordinate
construction is but one example of a special variety of coordination
indicating temporal sequence, usually with a further implication of
result, purpose, or goal: Melvin rushed out and bought us a cake,
Running over and pulling the switch always leaves me breathless, The
dean stood up and addressed the delegation, Sally's been going and
buying us books for years, The platter fell to the floor and shattered
into a thousand pieces, Watch and see who comes to the door!, Hurry up
and finish it!, You should stay and hear this. Note that there is no
restriction to the verbs go and come (although there is a restriction to
a subclass of intransitive verbs), nor to certain forms of those verbs
that do occur in this construction.

Observe that this special variety of coordination, which I shall
call unidirectional coordination, is distinct from ordinary (better:
logical) coordination in a number of ways: (a) unidirectional coordination
has semantic content beyond that of ordinary coordination (Persephone
pedaled off and purchased a pomegranate is not adequately paraphrased
by Persephone pedaled off, and she purchased a pomegranate, although
the latter is true if the former is); (b) some examples of unidirectional
coordination correspond to ordinary coordinations of questionable
grammaticality out of special context (cf. I went and enjoyed the
circus with ?I went, and I enjoyed the circus); (c) the conjuncts in
unidirectional coordination are not reversible salvo sensu (He dropped
to the ground and screamed ≠ He screamed and dropped to the ground),
sometimes not at all (*See who comes to the door and watch!, *Finish
it and hurry up!; (d) backwards pronominalization into the first conjunct is possible in unidirectional coordination (I ran after him and told George to remember the party, with coreferential George and him; I stood up in front of his father and praised the boy to the skies, with coreferential the boy and his; Watch him and see what the stranger does, with coreferential the stranger and him), but not, as noted by Langacker (1969), in ordinary coordination (in The man who hired him is conservative, and Mr. Marx is quite liberal and The man who hired him lost a lot of money and never cared much for Mr. Marx, him cannot refer to Mr. Marx); (e) there is obligatory tense harmony in unidirectional coordination (Melvin rushed out and is buying us a cake is only ordinary coordination); (f) the Coordinate Structure Constraint (Ross 1967, section 4.2) does not apply to unidirectional coordinations (compare What did I tell him to go (and) do? and Who did I tell him to stand up and talk to? with the ordinary coordinations *What did Melvin be/grow/become fat and adore? and *Who did the radio break down and no longer amuse?); (g) certain unidirectional coordinations of the form VP and am/are have a variant form VP and be (Whenever she wants it, I go/run in and am/be sweet to Eloise. Whenever I want it, you always come (over to my house) and are/be sweet to me. *Whenever she wants it, he goes and be sweet to her), but corresponding ordinary coordinations do not (You often go and are happy to see him, but *You often go and be happy to see him).

The shift of am/are to be provides evidence about the ordering of rules. Let us call the rule deleting the and of unidirectional coordination Reduction of Unidirectionals, and the rule shifting am/are
to be Infinitivization of am/are, or simply Infinitivization. I now argue that Reduction of Unidirectionals must precede Infinitivization, for although both I often go and am sweet to her and I often go and be sweet to her are grammatical in my dialect, neither of the reduced forms is: *I often go am sweet to her, *I often go be sweet to her. If Infinitivization precedes Reduction of Unidirectionals, then go and am will shift to go and be, and there is no non-ad hoc way of preventing Reduction of Unidirectionals from generating an incorrect occurrence of go be. But with the order of the rules reversed, Reduction of Unidirectionals will be inapplicable to all instances of go and am/are, including those that would be realized as go and be.

6.2. Formulation of Reduction of Unidirectionals.

The source of unidirectional coordination need not be investigated here; it is sufficient to suppose that the and of unidirectional coordination is formally distinguishable from the and of logical coordination, and that Reduction of Unidirectionals is sensitive to the distinguishing mark, which I shall indicate in the following discussion by an appended a. I shall also assume that features distinguishing past from present, plural from singular, and the three persons are assembled in an affix TNP (tense-person-number), which I shall take, for definiteness, to be a suffix.

The difficulty in formulating the rule can now be seen: and-a is deletable only when the preceding go/come (also the following verb) has the suffix TNP with the features [-past, -III] or [-past, +plural], or has no suffix (this clause covering all cases in which TNP has been deleted by rule, as in imperatives, subjunctives, and infinitives, or
absorbed by an earlier element, as in modal constructions, or moved away from its position before the main verb by Subject-Verb Inversion). A direct approach to these restrictions yields a most unnatural formulation of the rule, which I shall not bother to provide here. The crux of the problem is the fact that some of the values of TNP in the present are not realized phonologically, so that the resultant verb form is identical to the infinitive; otherwise, the restriction would be that go/come and the second verb both be without affixes. But the fact that the only value of TNP with phonological realization in the present is the third singular (except for be, in which case all values are realized, suppletively) must be represented somewhere in a grammar of English—and if it is represented directly by a rule deleting TNP when TNP is without phonological realization, and if this rule (Affix Deletion) is ordered before Reduction of Unidirectionals, then the reduction can be formulated quite simply, with reference only to an obligatory absence of affixes in certain positions:

Affix Deletion (obligatory; not applicable to be; applicable to modals throughout the present):  

\[
\begin{align*}
\text{VERB} & \quad \text{TNP} \\
-\text{be} & -\text{past} \\
\langle-\text{modal}\rangle & \{\text{-III} \} \quad \{+\text{plural}\} \\
1 & 2 \quad \Rightarrow \\
1 & \emptyset
\end{align*}
\]
Reduction of Unidirectionals (optional):

\[
\begin{array}{c|cccc|c}
\text{go} & \text{and-}\alpha & \text{VERB} & [-\text{affix}] \\
\hline
1 & 2 & 3 & 4 & \rightarrow \\
\hline
1 & \emptyset & 3 & 4 \\
\end{array}
\]

Infinitivization (optional):

\[
\begin{array}{c|cc}
\text{and-}\alpha & \text{be} \\
\hline
1 & 2 & 3 & \rightarrow \\
1 & 2 & \emptyset \\
\end{array}
\]

The formulation of the last rule is somewhat suspicious, referring as it does to the non-third-singular, a problem for which the earlier rule Affix Deletion was designed. The infinitivization rule should refer to the first verb of the unidirectional coordination, not to the form of be:

\[
\text{VERB} ( [-\text{affix}] X ) \text{ and-}\alpha \text{ be TNP} \\
\begin{array}{c|cccc|c}
1 & 2 & 3 & 4 & 5 & \rightarrow \\
1 & 2 & 3 & 4 & \emptyset \\
\end{array}
\]

The use of Affix Deletion to make the statement of other rules more natural forces these rules to be quite late in the sequence of rules. In fact, I know of no clearly syntactic rules that must be ordered after Affix Deletion, Reduction of Unidirectionals, and
Infinitivization. On the other hand, I know of no clearly phonological rules that must be ordered before any of these rules. In a sense, then, these rules lie on the borderline between syntax and phonology.

I must emphasize that what has been demonstrated in this section is not that it is inappropriate or incorrect to constrain Reduction of Unidirectionals and Infinitivization by conditions referring to phonology; rather, I have shown that such a treatment is not required, that there is an alternative and that this alternative does not require any ad hoc assumptions (some device with the effect of Affix Deletion being required in any event). Note, though, that a 'phonological' treatment of the phenomena at issue is attractive only insofar as it can be shown that syntax is not in general phonology-free; if the examples in this section were isolated, the analysis advocated here would be adopted without question, and if we eliminate other apparent cases of phonological influence in syntax we weaken the support for the assumption of phonological influence in this case. Moreover, the phonological information that would be required in this case is of a very special sort, the phonological identity of two different members of a paradigm, where only one of the members is mentioned in the rule or present, in any form, in the structure to which the rule applies. Even unequivocal evidence for the conditioning of syntactic rules by phonological features would not directly support this type of identity condition. I conclude, in the absence of further information, that the 'syntactic' treatment of the Go/come look at him! construction is preferable.
6.3. Argument against a Surface Structure Constraint.

As a final note on these constructions, let me remark that it is nearly impossible to account for the restrictions on the Go/come look at him! construction by means of a surface structure constraint, with Reduction of Unidirectionalss unrestricted. For consider how such a constraint would have to be formulated. A first approximation would be: in certain syntactic structures the sequence

\[
\text{go}/\text{come} ([+\text{affix}]) \text{VERB} ([+\text{affix}])
\]

is ungrammatical if either one of the affixes occurs. This will not do, because of the go swimming construction discussed earlier. A second approximation: the sequence is ungrammatical if either one of the affixes is present, unless the second affix is -ing. But then *We are going talking to Bob is not rejected by the constraint. A third approximation: the sequence is ungrammatical if either one of the affixes is present, unless the VERB is one of a small class of intransitives and its affix is -ing. But then the participial constructions discussed earlier (I came playing the bagpipes, Harry came racing across the field) will be incorrectly rejected, unless the constraint is sensitive to a phrase structure difference between these constructions and the go swimming construction. This is conceivable for I came playing the bagpipes, unlikely for Harry came racing across the field.

In any event, we are repeatedly forced to build all manner of conditions into the constraint, for the sole purpose of distinguishing the products of one rule, Reduction of Unidirectionalss, from the somewhat similar products of a number of other rules. The constraint clearly belongs on the rule itself.
6.4. A Similar Construction.

Sentences like Try and stop me!, I'll be sure and avoid the pit, Did he remember and get the bacon?, I always try and open them, and I want her to take care and be quiet illustrate another rule apparently restricted by an identity-to-infinitive clause: You tried and stopped me, I've been sure and avoided the pit, He remembered and got the bacon, She always tries and opens them, and She takes care and is quiet all have senses different from the clearly purposive interpretations of the earlier examples, which presumably are derived from their paraphrases with to-clauses (Try to stop me!, I'll be sure to avoid the pit, etc.) by a minor rule, Hendiadys, which replaces the to by and. The second verb is thus automatically in its infinitive form. For the rule to be applicable, the first verb must agree with the second in this respect. If Affix Deletion precedes Hendiadys, then Hendiadys can be stated as:26

\[
\begin{align*}
\{ & \text{try} \\
\text{remember} & \\
\text{be sure} & \\
\text{take care} & \}
\end{align*}
\]

to VERB

\[
\begin{array}{ccc}
1 & 2 & 3 \\
1 & \text{and} & 3
\end{array}
\]

If affixes were permitted after try, etc. in the rule, the rule would generate *You tried and stop me. *She always tries and open them, and the like.

7. Subject-Verb Inversion and the Contraction of NOT.

7.0. Introduction.

The treatment of various types of English sentences involving contracted and uncontracted not has been a recurrent problem for
transformational grammarians, ever since an analysis was first sketched by Chomsky (1957). The principles of this analysis appear elaborated in Klima (1964) and Fillmore (1967); I shall refer to these two works as representing the 'standard analysis', despite many differences of detail between them. The bases of the standard analysis have been attacked by Ross (ms. 1967), many of whose ideas are adopted in this section. In particular, I treat all verbal forms (obvious verbs, modals, do, have, and all uses of be) as instances of the category VERB, which is subdivided by various features—true verbs separated from all other VERBs by [ +auxiliary ], the modals from do, be, and have by [ +modal ], do from be and have by [ +do ], and be from have by [ +be ]. The employment of these features permits a number of infelicities (e.g. the otherwise ad hoc nature of the class composed of the modals plus have and be) to be removed from the standard analysis.

Four rules of the standard analysis are of interest here—in order, NEG-Association (which optionally 'incorporates' a negative element into a preceding VERB or affix), Subject-Verb Inversion (in questions), Affix Hopping (which moves TNP, -ing, and EN from in front of VERBs and 'incorporates' them into these VERBs), and DO-Support (which supplies a do to any remaining unincorporated affixes). The operation of incorporation in the informal descriptions of these rules is the focus of our concern, for its intended function is to cause certain combinations of items to be treated as units, and these units are nothing more than (phonological) words. Thus, the purpose of Affix Hopping, besides the inversion of position, is to make the VERB-affix sequence a unit. This effect can be achieved if the affix is Chomsky-adjointed
to the right of the verb, to yield a structure of the form

```
  VERB
   \   /
    VERB [+affix]
```

An analogous treatment of NEG-Association is difficult within the standard analysis, the problem being that there are instances in which the negative element must be incorporated into an affix. He doesn't like spinach is to be generated in this fashion, from he TNP NEG like spinach, so that if NEG is Chomsky-joined to TNP, the structure

```
  TNP
   \   /
    TNP NEG
```

results, and if this stranded affix is subsequently Chomsky-joined to a do supplied by DO-Support, then the unlikely structure

```
  VERB
   \   /
    VERB TNP
       \   /
        do TNP NEG
```

is generated. However NEG-Association is to be formulated, it must create some distinction between the sequence TNP (VERB) not and the sequence TNP (VERB) n't, because Subject-Verb Inversion will affect n't but not not: He does not like spinach, Does he not like spinach?, *Does n't he like spinach?, He doesn't like spinach, *Does hen't like spinach, Doesn't he like spinach?. That is, Subject-Verb Inversion moves the first (phonological) word of the auxiliary (but see later sections for reconsiderations of this claim).
The treatment of NEG-Association implicit in Chomsky (1957) is that the rule optionally marks NEG as [+contraction] and that Subject-Verb Inversion affects the sequence

\[ \text{TNP (VERB) ( [ \text{NEG} \ 
+\text{contraction} ] ) } \]

The mark [+contraction] later acts as part of the environment of the (obligatory) phonological rule contracting not to n't. This analysis resembles closely the vilified treatment of adverbial preposing in the hypothetical language of the introduction, except that the phonological contraction rule would be required even if English had no Subject-Verb Inversion rule (and hence no NEG-Association rule either), whereas the rule specifying certain consonants as [b] in the hypothetical language is motivated only by the adverbial preposing rule. However, it should be noted here that if syntactic rules are permitted to manipulate phonological rule-features, the range of possible grammatical processes and relationships is thereby extended enormously.

7.1. First Reanalysis.

Two of the worst features of the standard analysis as presented above are (a) that NEG-Association sometimes applies before an affix not associated with a verb, and (b) that although the affixes always form units with adjacent verbs, it is impossible to have this connection represented (except by ad hoc means) prior to the rule of Subject-Verb Inversion (Affix Hopping must follow inversion, for otherwise it TNP explode would become it explode TNP and inversion would be inapplicable). A remedy for these troubles is to suppose, first, that at the stage in derivations at which inversion applies, every tensed VP has a
[+auxiliary] VERB, which is do when no modal, have or be is present; and, second, that at the stage in derivations at which inversion applies, the features of TNP are associated not with a special constituent TNP, but rather with the first VERB in a VP.

Under this reanalysis a rule of Affix Creation, which 'segmentalizes' the tense-number-person features of a VERB in the manner of Postal (1966), assumes part of the function of Affix Hopping and the entire function of the rule Affix Deletion formulated in section 6.2. Affix Creation Chomsky-adopts to a VERB marked for tense-number-person of an affix with the same markings, subject to the conditions--essentially accidental facts of English morphology--that if the VERB is [+modal] it is also [+past] and that if it is [-modal, -be, -past] it must also be [+III, -plural].

The part of Affix Hopping that is not replaced by Affix Creation is the incorporation of the affixes -ing (of the progressive, of various nominalizations, of reduced adverbials like Before knowing the answer, I was quite puzzled, of reduced relatives like Any student not having a syllabus will be thrashed, etc.) and EN (of the perfective and the passive, of numerous constructions derived from them, and of a few special constructions, e.g. a well-behaved and soft-spoken child). In fact, almost the entire motivation for a rule of Affix Hopping is supplied by the progressive -ing and the perfective EN, because they have discontinuous privileges of occurrence with preceding VERBS (be and have, respectively) and because there are, apparently, no transformational rules deriving progressives and perfectives from other constructions (if there were, these rules could assume the function of positioning
-ing and EN), so that the dependencies must be assumed to be between elements contiguous in underlying structure. Hence, the need for something on the order of the celebrated phrase structure rule

\[ \text{AUX + TNP (MODAL) (have EN) (be -ing)} \]

and for a late Affix Hopping rule. The remaining support for Affix Hopping comes from complement constructions, in which there is a parallel between prefixal to and suffixal -ing (I hate to swim and I hate swimming), which might be exploited by assuming that both complementizers are positioned before the appropriate verb, with -ing later repositioned by Affix Hopping.

It is often assumed that all affixes are placed in front of the forms with which they are associated and that certain of the affixes are then shifted to suffixal position. For example, in Lees (1960) the agentive suffix, the affixes of derived nominals, the genitive suffix, and all occurrences of -ing and EN are so treated. But this treatment, which is motivated largely by a desire to use an existing rule to the fullest, is not necessary; merely possible. Thus, in a slight variant of the standard analysis the Passive rule could insert be before the main verb and Chomsky-adjoin EN to the right of that verb.

If the analysis being advocated here is to be entirely persuasive, it is necessary to attack the standard treatment of the auxiliary, so as to eliminate the principal evidence for Affix Hopping, the progressive and perfective forms. Ross has advanced a great many arguments to this end, most of them having to do with structure at levels deeper than the ones we have been dealing with here; I shall not summarize these arguments here.
In addition to Affix Creation, a rule of DO-Absorption (a replacement of DO-Support) is required to eliminate all surface occurrences of do that immediately precede a verb and are not emphatic or contrastive, with a concomitant transfer of features from do to the following verb. Below are rough statements of the rules, in order:

I. NEG-Association (optional):  

\[
\begin{array}{ccc}
\text{VERB} & \text{NEG} \\
1 & 2 & \rightarrow \\
1C2 & \emptyset \\
\end{array}
\]

Note that if there is a single rule NEG-Placement positioning the negative element after the first VERB, then the effect of 'NEG-Association' can be incorporated into the rule, which can be formulated so as to attach NEG by either sister-adjunction or Chomsky-adjunction. In subsequent discussion I shall continue to refer to 'NEG-Association', meaning by that either the rule above or the Chomsky-adjunction subclause of NEG-Placement.

II. Subject-Verb Inversion (obligatory):  

\[
\begin{array}{ccc}
\text{[+affective]} & \text{NP} & \text{VERB} \\
1 & 2 & 3 & \rightarrow \\
1 & 3+2 & \emptyset \\
\end{array}
\]

III. DO-Absorption (obligatory under conditions not stated here):  

\[
\begin{array}{ccc}
\text{[+do]} & \text{VERB} \\
1 & \tau \\
\emptyset & \begin{array}{c}
2 \\
\tau \\
\end{array}
\end{array}
\]
IV. Affix Creation (obligatory, with conditions as above):

\[
\begin{align*}
\text{VERB} & \quad \tau \\
\text{I} & \rightarrow \text{1C} \quad [+\text{affix}] \\
\end{align*}
\]

Affix Creation is a segmentalization rule of much greater generality than indicated here. It subsumes the rule Genitive Inflection of section 2; presumably, it creates all the inflectional endings of nouns, and perhaps other morphemes as well. Note that this analysis does not call for the use of phonological information in syntax. Rather the reverse, since the phonological rule contracting not will be contingent upon the existence of a node VERB immediately dominating the not.

7.2. Reformulation of Subject-Verb Inversion.

One difficulty attending upon the formulation of HEG-Association and the subsequent inversion in affective contexts is that in certain styles (exhortative, archaic, highly formal) and dialects, the inversion transports uncontracted not as well as contracted n't: Could not a man of courage overcome these obstacles?, Is not the search for riches a mean goal?, Did not my young acquaintance here gain health and happiness through the daily use of this inexpensive potion?. These examples strike me as fairly acceptable. In general, the acceptability of transported not in such examples depends upon the length and complexity of the subject noun phrase. The inversion is entirely unacceptable if the subject is a pronoun or expletive there (*Could not he overcome these obstacles?, *Are not there fairies in the bottom
of your garden?—hence the unacceptability of inverted not in
tag questions (Sam is coming back, isn't he?/is he not?/*is not he?).

Other monosyllabic subjects are unsatisfactory (*Could not Jack
overcome these obstacles?), but the sentences grow less dreadful as
their subjects approach the complexity of the initial examples above:
?Will not Susanna arrive soon?, Will not Lord Threshingham ride in
the hounds?.

To accomodate the moving of not as well as n't, the inversion
rule must be revised; for it seems quite clear that could not in
Could not Lord Threshingham have ridden to the hounds? is not a
unit in the same way that couldn't is. The revised rule:

\[
\begin{array}{cccc}
\text{[+affective]} & \text{NP} & \text{V} & \text{NEG} \\
1 & 2 & 3 & 4 \\
1 & 3+h+2 & \emptyset & \emptyset
\end{array}
\]

It might appear that this reformulation removes our original
justification for a syntactic rule NEG-Association, namely that not
had to be contracted before Subject-Verb Inversion so that the
latter rule could be stated simply. However, contemplate what happens
when the contraction rule is ordered after the inversion, either as
a late syntactic rule or as a phonological rule: the length-and-
complexity phenomena of the previous paragraph become facts about
NEG-Association, not about Subject-Verb Inversion, because the
contracted and uncontracted varieties of NEG are not distinguished
at the point at which the inversion occurs. This is an intolerable
consequence of the reordering. First, if the length-and-complexity
constraints are associated with NEG-Association, they must be
indicated as applicable only when NEG immediately precedes a noun phrase (i.e. only when inversion has taken place); this restriction, which is unnecessary if NEG-Association precedes inversion, is unmotivated and arbitrary.

Second, and more important, length-and-complexity constraints seem to be associated only with certain types of rules, namely those that move a noun phrase over a specified constituent, or a specified constituent over a noun phrase. For example, Genitive Preposing, discussed in section 2 above, yields unacceptable results if the NP that it moves is long, or (in certain cases) if it fails to move a very short NP. Also, Ross (1967:47-73) mentions the rule Particle Movement (relating I called up my brother and I called my brother up); it is obligatory when the object is a pronoun, as in I called him up versus *I called up him, and yields unacceptable results when the object is complex, as in ?I called the only man who knew the answer up). He mentions in addition a rule Complex NP Shift, which applies specifically to complex objects (Ross's examples: He threw into the wastebasket the letter which he had not decoded, We elected president my father, who had just turned 60, They dismissed as too costly the proposal for the State to build a sidewalk from Dartmouth to Smith, I consider unsolvable the problem of keeping the house warm in winter). A final example is the rule Motion Inversion, which relates Here comes John and Here John comes, also There goes John and There John goes. It is obligatory when the subject is a pronoun, as in Here he comes (*Here comes he), and yields unacceptable results when the subject is long and complex (*There my oldest uncle, who is French, goes).
In any event, Subject-Verb Inversion is a rule moving a specified constituent over a noun phrase, so that it is not surprising to discover a length-and-complexity restriction on it. But NEG-Association is not such a rule. I conclude that NEG-Association should be ordered before even the revised Subject-Verb Inversion.

I should add that there are subtle distinctions in meaning, which I do not understand, between questions with uncontracted not (Will Lord Threshingham not ride to the hounds?, Will not Lord Threshingham ride to the hounds?, Lord Threshingham will ride to the hounds, will he not?) and those with n't (Won't Lord Threshingham ride to the hounds?, Lord Threshingham will ride to the hounds, won't he?). This fact appears to be entirely consistent with the 'affixal' treatment of contraction that I have been developing here; the difference between sister-adjunction and Chomsky-adjunction of not can be triggered by features correlated with the semantic differences, perhaps (as suggested in section 7.1) in adverb placement rules rather than in a special 'contraction' rule. On the other hand, at the level at which phonological rules apply, the requisite information for triggering contraction will not be uniformly represented; to save the 'true contraction' treatment, one must appeal to semantic rules that are sensitive to superficial (syntactic or phonological) information, as advocated in Chomsky ms. (1968), or to phonological rules that are sensitive to deep semantic information.

7.3. Final Reanalysis.

The reformulation of the previous section is suspicious in one respect: the revised inversion rule is formulated so as to move a non-constituent, the combination VERB NEG (whether contracted or not).
Rules affecting non-constituents in this fashion are so rare that it is reasonable to attempt to restrict the theory of grammar by prohibiting them entirely. A reanalysis in which such a movement is not required has been put forth by McCawley (ms. 1968), who argues that English is an underlying 'verb-first' language, so that English would have not a Subject-Verb Inversion rule, but rather a rule of Subject Formation that moves the first NP of a sentence into sentence-initial position; Subject Formation must then be blocked in the 'affective' contexts.

Although I shall not give a detailed statement of, or defense of, McCawley's analysis here, observe that it has attractive consequences for the problems under discussion in this paper: in addition to eliminating a non-constituent movement, the reanalysis permits a strengthened version of the generalization in the previous section concerning the possibility of length-and-complexity constraints. Now we can hypothesize that such constraints are relevant only for transformational rules that move an NP (instead of for rules that move an NP over something or something over an NP).

8. Summary and Remarks.

In the preceding sections I examined the use of phonological information in English syntax and observed that most of the phenomena considered could be explained by having rule-features determined by aspects of underlying phonology (as in section 3 for inchoatives and causatives in -en, in section 1 for inflectional comparatives and superlatives, and in section 2 for inflectional genitives, although it it also possible to give an account of these last facts with a
surface structure constraint). In sections 6 and 7 I argued at some length that there are late syntactic rules, Affix Creation and NEG-Association, organizing morphemes into units of about the size of words, and that these rules provide the basis for plausible replacements for references to phonological identity and wordhood. Finally, in sections 4 and 5 I examined a number of apparent cases of reference to phonology in surface structure constraints, concluding that except for conditions involving stress levels, these constraints refer to classes of morphemes or words rather than to the phonological shapes (or the specific phonological features) of morphemes or words. However, I pointed out that unassailable instances of surface structure constraints referring to syllabic structure, and perhaps segmental features as well, will probably be forthcoming.

Several aspects of the resultant view of syntactic processes deserve mention here. It has already been noted that if phonological influences on syntax are as limited and indirect as I have been arguing, then the boundary between syntax (rules and constraints not referring to phonological information) and phonology (rules and constraints referring to at least some phonological information) is fairly sharp. A moderately strong hypothesis would be that after the first rule or constraint employing a phonological predicate, every following rule or constraint employs at least one phonological predicate. Equivalently: it is never the case that a rule or constraint employing a phonological predicate need be ordered before one not employing a phonological predicate. Support for the hypothesis comes from two sorts of observations: first, that no syntactic rule employs
phonological predicates; and second, that no strictly syntactic or 'morphological' rule must be ordered within the phonological component. The first observation is the subject of the preceding sections of this paper. The second observation seems to be correct, although the subject needs further attention; I know of no putative counterexample convincing enough to merit discussion here.

It is perhaps significant that the processes we have been examining are all late syntactic rules (or constraints). One possible speculation on the matter is that there is an identifiable 'late syntactic component' (which could reasonably be called a 'morphological component', although not all of its contents would fall within the traditional domain of morphology) and that the rules within this component are subject to strong restrictions as to their form. It might then be possible to press forward the hypothesis that only rules of the morphological component have lexical exceptions that are determined by phonological form: note how strange it would be for a cyclical rule like Subject Raising (see Kiparsky and Kiparsky, to appear) or Passive to be applicable only to (or inapplicable to) verbs that have underlying representations which are disyllables, or which end in an obstruent, or which have a tense vowel in the first syllable. One way to make the hypothesis precise and non-vacuous would be to identify the morphological component as the set of rules concerned with word formation. Such rules have other special properties; for example, they create anaphoric islands, in the sense of Postal (1969).

As a final remark on the arguments presented in the first part of this paper, I should note that some of the analyses, although supported by evidence, nevertheless might have an unconvincing ring
to them. The treatment of inflectional comparatives and superlatives in section 1, of the *Go/come look at him!* construction in section 6, and of contraction and inversion in section 7, for example, might be criticized as technically correct but indicative of flaws in the theoretical framework because these analyses 'miss the point' or do not correctly 'capture the generalization', where the point in section 1 is that inflection is avoided if long sequences of unstressed syllables would result, the point in section 6 is that the verbal forms must be identical to their infinitives, and the point in section 7 is that inversion normally moves the first (phonological) word of the auxiliary.

To reply to this line of criticism it is necessary to distinguish the rules of English from explanations for the existence of these rules or for various properties of them (their form, ordering, restrictions, etc.). Consider the restrictions on the inflectional comparatives and superlatives. To some degree, these do serve to prevent long sequences of unstressed syllables, and various stress rules of English can be interpreted as having this function too. But there is no reason to suppose that this function is directly reflected in the form of the restrictions and the rules; indeed, to insist on such a direct reflection is to obscure what is to be explained. A better approach to these problems would be to attempt to assign a precise sense to 'prevention of long sequences of unstressed syllables' and then to investigate the ways in which this preventive tendency can be manifested and how it correlates and interacts with other tendencies. Or, consider the problem of explaining why in English the word *it*, and not some other word, appears as the representative of an extraposed complement.
One way to approach the problem is to abandon efforts to motivate
the it on the basis of facts internal to English and to suppose that
from aspects of the extraposition rule it is possible to identify a
small class of forms (actually, complexes of features) that can serve
as the representative of the extraposed clause, on the basis of
principles of general linguistic theory. These speculations are
necessarily rather vague, referring as they do to details of as-yet-
undiscovered generalizations in linguistic theory; but the strategy
implied—treating rules as low-level, but real, generalizations while
searching for higher-level generalizations—seems likely to be fruitful.

A distinction between rules and their explanations has been
advocated in phonology by Bach and Harms (to appear), who argue that
considerations of simplicity (having to do with the form of rules) must
be separated from considerations of plausibility or 'naturalness'
(having to do with explanations for the rules) and that the addition
of a phonological rule to a grammar is subject to plausibility constraints
in a way in which the occurrence of a phonological rule in a grammar is
not. In recent work by Kisseberth (1969) an attempt is made to get at
the notion of 'plausible rule' by means of an evaluation metric that
ranks a given rule \( R \) with respect to other, similar rules that might
stand in place of \( R \), rather than by means of the usual evaluation metric,
which assigns an absolute value to each rule.\(^\text{36}\) Within such a framework
it is possible to make precise such commonplace observations as that
the devoicing of obstruents in word-final position is more plausible
than voicing, but that voicing of obstruents in intervocalic position
is more plausible than devoicing.
Footnotes

1. I am indebted to Michael L. Geis, Paul M. Postal, and Ann D. Zwicky, who provided detailed criticisms of preliminary versions of this paper.

2. Undoubtedly, some kinds of stylistic information are also associated with lexical items.

3. In general, 'independent motivation' can be either internal to a language or based on hypotheses about linguistic universals. Thus, even if the grammar of some language need refer to the person feature [+III] only once, that feature is still to be considered motivated.

4. Kruisinga (1932:3.62-7) and Jespersen (1949:347-63) have good discussions, the former providing the terser description, the latter the more detailed. Poutsma (1914:474-91) concentrates on unusual forms.

5. Conjunction reduction provides a terminus ante quem for other processes of word formation. For example, if tonight is derived by rule from this night (like this morning, this afternoon, and this evening; also last night, tomorrow night, and Monday night), then this rule must apply before conjunction reduction: I'll work all this morning and afternoon, I'll work all this afternoon and tonight. *I'll work all this afternoon and night.

6. This direction of derivation is supported by the fact that the periphrastic forms are always possible, whereas the occurrence of the inflectional forms is quite restricted, and by the fact that comparatives and superlatives pattern with other degree constructions, none of which is inflectional (e.g. very happy, so happy that..., too happy to..., as happy as..., happy enough to...).

7. There may be some instances of predictability in the reverse direction as well. Perhaps the fact that English inflectional morphemes have alveolar (rather than labial or velar) consonants is to be described in this fashion.

8. J. R. Ross has suggested to me that this predictability is a manifestation of a 'conspiracy' in English against the occurrence of sequences of vowels (also manifested by a vowel deletion rule in propagandize < propaganda-ize, by a tensing rule in variety < vary-ity, by the selection of an instead of a, etc.). Verbs ending in -a would have such a sequence in their present participles (hulaing).

9. I use italics to cite forms in conventional orthographies; flanking brackets to cite transcriptions, which are to be taken as phonetic except where the context makes it clear that a more abstract representation is intended; and flanking slashes to cite underlying
forms. The phonetic transcriptions are in general quite broad. In particular, many distinctions of quality and quantity of vowels are not marked.

10. Both the restriction on feet, teeth, etc. and a restriction on complex plural noun phrases are noticed by Kruisinga (1932:2.39), who concludes that 'English has no genitive plural'.

11. Genitive Inflection is, in fact, a clause of a more general rule, Affix Creation, discussed below.

12. J. Bruce Fraser has pointed out to me another case apparently of this type. The verbs governing Dative Movement are, with few exceptions, monosyllabic. For example, give, tell, and pay permit Dative Movement (I gave a book to him, I gave him a book), but donate narrate, and deliver do not (I donated a book to the library, *I donated the library a book).

13. There are two classes of phenomena which bear some resemblance to idioms, but differ from idioms in the treatment of irregularities. In uses of words or phrases as proper names, irregularities are often eliminated (as T. M. Lightner has pointed out to me, two copies of Life are two Lives, and the Toronto hockey team is the Mapleleaves, not the Mapleleaves). Also, specialized senses of words often differ from more general senses by preserving irregularity (He was stricken by anguish, but He was struck in the face and He was struck by the beauty of the scene), although occasionally they differ by having regular formations (He hanged himself).

14. Fraser (ms. 1968) puts forth the hypothesis that idioms can be ordered in a hierarchy according to their 'frozenness' with respect to certain types of transformational operations. The behavior of idioms under conjunction reduction is separate from this hierarchy, since all idioms are frozen with respect to conjunction reduction; even least-frozen idioms like pass the buck and not subject to it (*He passed the buck and a slab of bacon).

15. Much of my discussion here depends upon observations made at the 1968 La Jolla Conference on English Syntax by Postal, Ross, Lakoff, and McCawley.

16. For example, McCawley has noticed that the constraint is not equally applicable to subjects and predicates: #Max, Sue, and Max were chosen by Aaron, Bertha, and Charles, respectively, but Aaron, Bertha, and Charles chose Max, Sue, and Max, respectively.

17. The Spanish 'spurious se' rule refers to sequences of forms of the same type, not to sequences of identical forms. But perhaps it is not accidental that the rule eliminates every sequence of two pronouns beginning with [1], and that the surface structure constraint rejects the only remaining sequence of pronouns beginning with identical consonants, se se.
18. Certain occurrences of that that and for for are prohibited: *That that she fell down amused me annoyed Sally, *For for Sally to fall down to amuse me would annoy her. The restriction here is on the embedding of complements in complements, not on the output sequences; note also *That for Sally to fall down would amuse me annoys her, *For that Sally might fall down to amuse me would be reprehensible. That the constraint is nevertheless on surface structures is indicated by the fact that the offending constructions can be corrected by an application of Extrposition (for which see Rosenbaum 1967); That it amused me that she fell down annoyed Sally, For it to amuse me for Sally to fall down would annoy her, etc. See also the discussion by Langendoen (to appear).

19. A further possibility is that one element of such a sequence is replaced, as in the 'spurious se' rule.

20. I am indebted to J. R. Ross for calling this fact to my attention.

21. Finish it, and hurry up! (with an obligatory comma intonation) involves a different construction.

22. It is often supposed that the source is the to-clause of purpose, via a rule replacing the to by and and making the appropriate tense adjustments; see, for example, Poutsma's (1929:559-69) discussion of 'hendiadys' in English. The construction treated in section 6.4 is so derived, and uses of to are involved in the sources of other constructions (I'm going back and tell him to go to hell < I'm going back and I'm going to tell him to go to hell, I've been and seen the queen < I've been to see the queen). But the meaning associated with unidirectional coordination is not the same as the meaning associated with purpose clauses; this is especially clear in the past tense (cf. Calvin went and bought his wife a sable with Calvin went (,) to buy his wife a sable, which does not assert that he bought one, and They watched and saw what happened with They watched (,) to see what happened, which does not assert that they succeeded). The treatment of these phenomena by most traditional grammarians is unsatisfactory, because they lump together disparate cases—most of the constructions mentioned in this section, plus the 'joint' construction in She sat and knitted, I lay in bed and read, and Maggie likes to play the guitar and sing.

Postal (1968:23) has pointed out that coordinate sentences with explicit indications of temporal sequence, result, purpose, or goal (e.g. so, then, therefore, consequently, thus, because of that) in the second conjunct differ from normal coordinate sentences in various ways (irreversibility of conjuncts, possibility of backwards pronomin- alization, interclause restrictions on tense and on time adverbs) which can be taken as indications that the less superficial structure of these coordinate sentences involves subordination rather than coordination (so that She smiled at me, and then I smiled at her would have a remote structure closer to (she smiled at me) preceded [I smiled at her] than to (she smiled at me) and (I smiled at her then)). Postal's observation is relevant to the analysis of unidirectional
coordinations, which are, largely, implicit versions of the constructions he mentions. But difficulties arise in the analysis of unidirectional coordinations in which *go* in the first conjunct is not interpreted as a true motion verb; e.g. He went and solved the problem is not paraphrased by something on the order of His going resulted in his solving the problem.

23. It might be suggested that a feature [+infinitive] be assigned to all verbs and that Reduction of Unidirectional[s refers to this feature. But such a treatment is no better than the one criticized in the body of the text. Note that if the approach is to succeed, the rule of subject-verb agreement must be restricted to apply in the present tense only when the subject is third person singular; and the [+infinitive] marking must be restored if Subject-Verb Inversion applies.

24. For the interpretation of the angle brackets, adopted from phonology, see Chomsky and Halle (1968:76f.). Flanking variables have been systematically suppressed in the statement of transformational rules in this article. The rule of Affix Deletion is revised in section 7, where the features are also discussed.

25. The intention here is to eliminate from the domain of the constraint such obviously irrelevant constructions as Everyone going wants to fly and My intention to come surprised them.

26. The list of verbs is exhaustive, in my dialect. The correctly formulated rule does not, of course, enumerate the verbs to which the rule is applicable, but rather merely mentions the category VERB.

27. Infinitives are not so marked, because of a prior failure of subject-verb agreement to apply to them (the fact that the infinitive in English, and some other languages, is identical to the verb stem is then not entirely accidental). In Kiparsky and Kiparsky to appear, it is suggested that the infinitive appears when the subject has been removed from a sentence; however, Perlmutter (1968:238f.) observes that in sentences like I hate it for Clara to sing in German and She slaved in order for her husband to be able to live comfortably, the subject remains but an infinitive appears nevertheless.

28. [+affective] is an ad hoc abbreviation for the environments triggering Subject-Verb Inversion. \* denotes the complex of tense, number, and person features. C stands for Chomsky-adjunction, + for sister-adjunction.

29. There are cases in which the rule appears to be obligatory: I went, but John did not/didn't/did not. Perhaps also in some imperatives: Don't be so shy!, Don't be so shy!, Don't be so shy!. 
30. Subject-verb agreement must precede this rule. Reformulations of the rule are discussed in sections 7.2 and 7.3 below.

31. What happens here is that the features [+plural] and [-genitive] are associated first with NPs as wholes. The former feature is then assigned to the head noun, the latter to the final word of the NP. One advantage of assuming that the plural ending originates as a feature is that nouns like sheep can be treated as regular except for not undergoing the nominative plural clause of Affix Creation; in the notation of section 2, sheep has the feature [-genitive] D [- Affix Creation].

32. Some informants find I called up him, not her completely acceptable (it is only marginal for me), indicating that some aspects of stress contribute to length and complexity.

33. Ross proposes an elaborate surface structure constraint, a treatment demonstrably required for Dative Movement, which relates I gave George the answer and I gave the answer to George (for a discussion of the rule see Fillmore 1965), and which is (apparently) obligatory when the direct object is a pronoun (I gave it to George, *I gave George it). The critical observations about Dative Movement appear in Bach (1967).

34. A restriction that refers to length, but seems to be of a type different from those considered in this section, is one on the order of adjectives coordinated with and or or. Vendler (1968:122) notes that red and yellow and long and narrow are preferable to yellow and red and narrow and long and concludes that 'here we are influenced by a simple phonetic rule: in joining words by and or or, the shorter element comes first', citing also black and white, up and down, in and out, fields and meadows, odds and ends, nuts and bolts. In the extensive study of 'irreversible binomials' by Malkiel (1959), the predilection for binomials of the form short plus long is noted as the most significant influence on the ordering of the conjuncts, although several other factors are discussed.

35. I am indebted to Paul Postal for pointing these out to me.

36. Both discussions take off from an earlier attempt to incorporate plausibility considerations with phonological theory, the notion of 'linking' presented in chapter 8 of Chomsky and Halle (1968).

References


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