



Auxiliary Reduction in English

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o. Introduction: Nonphonological Conditions on Phonological Rules

The view of phonology that is most restrictive in its use of nonphonological information is one in which the input representation of a sentence is a string of instances of phonological units, where each unit has constant phonetic correlates. In combination with other assumptions (e.g. that the phonetic correlates for a unit are criterial for that unit), this view is characteristic of pronouncements on phonemic theory during recent decades. It is this view which is attacked in Pike's "grammatical prerequisites" articles (Pike 1947 and 1952), which argue that indications of the boundaries between words and between morphemes are also required.

It is well known that much further nonphonological information is required for the correct explanation of various phonological processes. These are (a) not only indications that there are boundaries between units (words or morphemes), but also specifications of the nature of the units separated (morphemes, words, or phrases), and perhaps even finer distinctions, such as the one between the boundaries +, =, and # in Chomsky and Halle (1968, 364-371; see also McCawley 1968, 52-58); (b) specifications of the grammatical categories to which certain words and phrases belong (as in the English stress rules given by Chomsky and Halle; see also Postal 1968, 115-119); (c) specifications of syntactic and morphological features; e.g. [\pm animate], [\pm feminine], [\pm native], (for which see Postal 1968, 119-129); and (d) rule-features, marking certain forms as not undergoing general rules or as undergoing special rules (see Postal 1968, 129-139, where an attempt is made to distinguish simple exceptions from divisions in the vocabulary, and see also Chomsky and Halle 1968, 373-380). In addition, the hierarchical arrangement of phrases within phrases controls the application of cyclical phonological rules, although as Bierwisch has pointed out (1968), stress rules controlled in this way must be assumed to be inapplicable past a certain level (furthermore, it is quite likely that only a few types of rules will require cyclical treatment).

Despite the fact that there are many ways in which information of an essentially

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nonphonological or syntactic nature can determine the applicability of a phonological rule, there are innumerable types of nonphonological information which presumably cannot be referred to in phonological rules, even where the usual assumptions about the relationships between the major components of a grammar do not implicitly prohibit such reference. I give here three classes of cases.

First, semantic information is associated with lexical items, so that unless explicit conditions rule out the carrying along of, or reference to, this information, phonological processes could be conditional upon it. Hence, one might expect to find phonological rules that applied only to nouns customarily referring to females; instead, one finds rules referring to feminine gender. Semantic classes, it seems, have phonological correlates only through the mediation of syntactic classes and morphological markings.

Second, syntactic rule-features, indicating whether or not governed rules may apply, are associated with verbs throughout the syntactic component, so that unless explicit conditions rule out reference to these features, phonological processes could be dependent upon them. Hence, one might expect to find phonological rules that applied only to forms of passivizable verbs; instead, one finds rules referring to verbs that have been passivized.

Third, and most serious, the full power of transformational grammar is available for the formulation of syntactic rules that do nothing more than mark specified constituents as subject to a given phonological rule. Thus, one might imagine a rule identical in form to the English rule *Relative Clause Formation*, except that rather than moving an NP it merely marks that NP as [+Truncation], where *Truncation* is a rule simplifying word-final consonant clusters. Or one might imagine a cyclic rule that marks a verb [-Nasal Assimilation] if an NP follows it. The effect of such a rule would be to make *Nasal Assimilation* inapplicable in any verb that has an "object" at one or more stages in its derivation. Rules of this sort strike me as quite unnatural, in general, although there are familiar processes, regular vowel gradation for instance, that are not very different in form; the difficulty arises in distinguishing impossible utilizations of transformational devices from such common phenomena as the conditioning of phonological rules by "grammatical" (as opposed to "lexical") morphemes, or by (independently motivated) features that happen to be manipulated by transformational rules. What is required is a substantive theory of syntactic features—and more besides, for if transformational rules can insert material, then the effect of any unnatural rule involving features can be achieved by an equally unnatural rule inserting a "silent morpheme", one with no phonetic effect beyond the conditioning or blocking of a phonological rule.

The assignment of prosodic features presents a number of problematic cases with respect to the independent motivation of the features or morphemes triggering phonological rules, as well as with respect to the nature of the rules themselves (see Bierwisch 1966 for some discussion of these matters). For example, given that features of em-

phasis or contrast cause certain phonological rules to apply, is the introduction of these features analogous to, say, the marking of certain verbs as [+causative], thereby occasioning the application of an ablaut rule? I have nothing new to say about problems of this type, which I mention here only because the prediction of prosodic features by means of syntactic rules requires either (a) the incorporation of the required features within a motivated theory of syntactic features, or else (b) the identification of processes of this type as a class of exceptions to the generalization that syntactic rules cannot introduce, or otherwise manipulate, features or morphemes which serve only to indicate whether or not a phonological rule is applicable.

With the possible exception of prosody rules, then, I have made it appear that all the nonphonological information needed to determine the applicability of a phonological rule is contained in superficial syntactic structures—call this the *Principle of Superficial Constraints* in phonology. As just stated the principle is both too weak and too strong. It is too weak because there are considerable restrictions on the extent to which surface syntactic information can be used. I suggest that none of the following can be conditions on the applicability of a phonological rule in a human language: (1) the rule applies only to the fifth word in a sentence (or, to any word but the fifth);¹ (2) the rule applies only to morphemes embedded at least (or, no more than) four Ss deep; (3) the rule applies only to morphemes following (or, before) the last VERB in a sentence; (4) the rule applies only to morphemes dominated (or, not dominated) by an NP, at whatever remove. It is easy to construct impossible processes of this type, not so easy to formulate the appropriate restrictions on phonological theory. Indeed, I shall not attempt these formulations here.

The principle is too strong on several grounds. First, there appear to be some systematic differences between the structures which result naturally from the operation of the syntactic component and those to which certain phonological rules apply. For these cases Chomsky and Halle (1968, 371f.) have suggested, with reservations, the postulation of special “readjustment rules”, the only function of which is to transform the motivated output of the syntactic component into the appropriate input to the phonological component. Next, in one case it has been argued (in Bierwisch 1968) that the correct generalization about the domain of a rule, there a stress placement rule, must be made with respect to structures obtaining prior to the application of a clearly syntactic rule, the positioning of separable particles in German. Finally, it has been argued (in Vennemann 1968) that certain kinds of “paradigmatic” information can determine the applicability of phonological rules. Vennemann’s example is a German syncope rule that is in general inapplicable in one environment, but applies nevertheless in this environment to verbs exhibiting a vowel contrast in the present indicative.

¹ Rules referring to the beginning (or end) of a sentence or clause are, of course, possible, as are rules referring specifically to the first word (e.g. the Sanskrit rule that positions *ca* ‘and’ after the first word of a coordinate clause).

It should also be noted here that if stress-dependent conditions on English pronominalization are stated in constraints ordered after the rules determining stress levels, then these constraints, located within the phonological component, will refer to predicates not definable from surface structure alone, for instance the predicate ANTECEDENT OF and the subject-nonsubject distinction (see Lakoff ms. 1968).

In the body of this paper I examine the English contraction rule *Auxiliary Reduction*, by way of investigating the extent to which it and rules related to it are dependent upon information not available in surface structure, or are restricted by complex conditions referring to syntactic and phonological information available in surface structure. Inasmuch as only a handful of problematic cases are presented in detail here (or elsewhere), I shall not attempt to extend phonological theory to accommodate these facts. This extension must wait upon the accumulation of further data of similar type.

1. Preliminaries I: The Rule Glide Deletion

This rule drops morpheme-initial [h] quite generally, [w] only in *will, would, was, and were*,² and [ð] in *they, them, than, this, these, that, those, and there*. It does not affect [y].

In slow, careful speech the rule does not apply, except for some speakers in the word *forehead* [fárid]. At moderate rates of speech it applies to certain unstressed pronouns and auxiliaries (*he, him, his, her, have, having, has, had, will, would, them*; also *than*), and in faster speech it is extended to the other listed forms with [w] and [ð], and to all occurrences of [h] before syllables with relatively weak stress (e.g. the initials in *horrendous, humanity, and Hispanic*, and the medial [h] in *philharmonic*, perhaps also in *cathouse*; compare *inhuman* and *disharmony*, which maintain the [h] except in quite fast or careless speech). In definitely fast speech initial [h] drops in examples like *I'm glad Jóhn hit me, not George* and *It was Jóhn's hat, not George's, that got crushed*, where the vowel following the [h] bears stress, but relatively little in contrast to nearby syllables.

Note that *Glide Deletion* cannot be said to apply to [h ð w] before [-stress] vowels, or before vowels marked [α stress], where α must be greater than some specified integer; rather, the rule applies before vowels that are relatively unstressed with respect to their immediate environment (however this condition is to be formalized). Thus, as already noted, the [h] of *hit* or *hat* is deletable when the stress on these words is overshadowed by a neighboring contrastively stressed word. Similarly, the dropping of initial [h] is quite unnatural when it is located at the beginning of a sentence,³ or after any major juncture, even when the following vowel bears only weak stress (as in *He's my best student, Melvin—he was my best student—flunked the last test, and Melvin,*

² Also, as C.-J. Bailey has pointed out to me, the rule applies obligatorily in *toward, leeward, and Greenwich*, if an analysis of these forms as containing morphemes beginning with [w] can be justified.

³ The dropping of [ð] in *Atta boy!* and the like seems to be truly anomalous.

having flunked the last test, joined the French Foreign Legion).⁴ Also, *Glide Deletion* is less acceptable before *not* than in the corresponding positive sentences (cf. *Tess's been here* with ?*Tess's not been here*); the explanation of these examples is that the main stress of the positive sentence is on the word immediately following *has*, whereas in the negative sentence the main stress is further away from *has*.

The stress condition on deletion of [h] should be contrasted with the stress conditions on vowel reduction. Thus, although the [h] can drop in sentences like *That's my hat, stupid!*, the word *hat* maintains its vowel [æ], even in quite fast speech. It should also be emphasized that, given the required stress environment and the appropriate style and speed of speech, any initial [h] drops, without regard for the syntactic features of the morpheme it begins. Here *Glide Deletion* contrasts with *Auxiliary Reduction*, which applies only to *have*, *has*, and *had* in certain senses (and not at all to *having*), even when these forms occur in contexts where their initial [h] drops (see the next section for details).

The restriction of *Glide Deletion* to only a few forms in [ð] and [w] does not seem to have an explanation in terms of other facts about English, although considerations of general phonological theory are undoubtedly relevant here, [h] being, in general, more likely to drop than [ð] or [w], and [w] more likely than [y].⁵ More puzzling is the division of the forms in [ð] and [w] into two classes, with *Glide Deletion* applying to *will*, *would*, *them*, and *than* in slower speech than to the remaining forms. Thus, although the stress patterns are identical in *I saw them* and *I saw that*, the first reduces more readily than the second; similarly for *She will go* and *She was gone*.⁶ The complete exclusion of *the* from the domain of *Glide Deletion*—despite the fact that *the* typically occurs in the best environment for the rule, namely unstressed and preceding a stressed word—is perhaps to be explained as avoidance of extensive homonymity between *the* and *a*, although explanations of this sort are extremely weak (many languages manage without an obligatory distinction of definiteness, and English permits homonymity as a result of other contraction rules, as when *him* and *them* reduce to [m̩] and when *how did you*, *how had you*, and *how would you* are all realized as [hawjə]).

2. Preliminaries II: Initial Observations on Auxiliary Reduction

This rule and *NOT-Contraction* are the most familiar contraction rules of English, the ones regularly represented in the orthography.⁷

⁴ There are, of course, dialects in which *Glide Deletion* is much more widespread than it is in mine. Cockney is a famous example. But even there [h] tends to be preserved after junctures: "It is mostly likely to occur in heavily stressed syllables, under emphasis, and it is always preceded by a juncture" (Sivertsen 1960, 141).

⁵ See Zwicky (to appear) for a short discussion of hierarchies of this type.

⁶ Some speakers find the reductions of *was* and *were* unacceptable at any rate of speech.

⁷ There are several interesting aspects to *NOT-contraction*. First, in my dialect *not* appears either in its full form [nat] or in its completely reduced forms [nt ~ nt̩]. There is no intermediate form [nət]: *[ay kænət/wilnət gow]. This lack of an intermediate reduced form can be explained by having some occurrences of *not* enter the

Auxiliary Reduction applies to eight forms only:⁸ *is* and *has*, which reduce to [z]; *would* and *had*, which reduce to [d]; *have*, which reduces to [v]; *am*, which reduces to [m]; *are*, which reduces to [r]; and *will*, which reduces to [I]. Of the remaining forms of *be*, *have*, and *will* that begin with vowels, [h], or [w]—*having*, *was*, *were*, and all forms with enclitic *n't* (*isn't*, *hasn't*, etc.)—none are subject to the rule.

It is clear that *Auxiliary Reduction* is to some extent dependent upon the prior application of *Glide Deletion*, for the reduction is never applicable in environments in which the deletion is blocked; contrast *She's been here* and *?She's not been here*, which exhibit differential acceptability because of the stress conditions on *Glide Deletion*, with *She's here* and *She's not here*, which are equally acceptable because *Glide Deletion* is not involved. Moreover, the assumption that *Glide Deletion* precedes *Auxiliary Reduction* permits the latter to be stated fairly simply, as a rule deleting word-initial unstressed lax vowels, rather than as a rule deleting vowels together with (in some cases) preceding glides:

$$\left[\begin{array}{c} \text{V} \\ -\text{tense} \\ -\text{stress} \end{array} \right] \longrightarrow \phi / \#\# \text{ ____ } [+ \text{cons}] \#\#$$

A few comments on the form of the rule (which will be considerably revised in subsequent sections): the condition that only one segment follow the vowel to be deleted prevents the rule from applying to the forms with enclitic *n't*, or to *having*;

phonological component as affixes to verbs, like the "neutral" suffixes *-ness*, *-able*, and the inflectional endings of nouns and verbs. These instances of *not* will then remain stressless because of their affixal character, and we require an obligatory vowel-deletion rule, stated below in a fairly general form (although it is a very minor rule applicable only to the lexical item *not*):

$$\left[\begin{array}{c} \text{V} \\ -\text{tense} \\ -\text{stress} \end{array} \right] \longrightarrow \phi / \text{____} \text{C} \#]_{\text{VERB}}$$

The further phonological alternations exhibited by *not*, namely the variation between [nt] after obstruents (*has*, *had*, *is*, *was*, *does*, *did*, *could*, *ought*, *need*, *must*) and [nt] after vowels and [r] (*may*, *do*, *are*, *were*, *dare*), are accounted for by an independently required rule syllabifying resonants in the environments C___C and C___# (cf. *shown* and *proven*).

Second, a number of verbal forms have special obligatory variants before *n't*, and only there. In two cases these forms are predictable by familiar obligatory rules, if *n't* is treated as an affix: *can't* [kænt], instead of the otherwise expected *[kænnɪt], shows a simplification of geminate stops (Chomsky and Halle 1968, 148–151), a rule that can be supposed to apply before the syllabification rule; *musn't* [mʌsnɪt], instead of the otherwise expected *[mʌstnɪt], shows an application of the obligatory [t]-deletion also operative in *moisten*, *soften*, and similar examples. The form *don't* [daʊnt], replacing the expected *[duwnt], is anomalous in not undergoing the vowel shift, although [duw] (from /dō/) does. Next, *will* and *shall* drop final [I] before [nt] just as they do before "past" [d] (*would*, *should*), while *will* exhibits an additional, apparently truly anomalous, shift of [i] to [ow]. Finally, *am* lacks the expected negative *[æmnɪt], for which a more general form *ain't* [eɪnt] serves in some dialects. These facts, although ranging from the regular to the arbitrary, indicate that *n't* should be treated as a verbal affix.

⁸ *Auxiliary Reduction* is not the only rule reducing auxiliaries in English. *Did* contracts to [d] quite extensively (*Who'd* [huwd] *he see?*, *When'd* [wend] *they go?*, *What'd* [wad] *he want?*), *do* largely before *you* only (*Who do you* ([huwd(ə)yə] or [huw]jə) *know around here?*, but *What do you* [wadəyə] *want?* and *Who do* [huwdə] *our supporters favor?*). Also, *have* (and *of*) has the reduced form [ə], e.g. *would have* [wudə(v)] and *might have* [maɪdə(v)] (similarly *a friend of mine* [ə frendə(v) maɪn]). The restrictions on these rules, which deserve further study, are quite different from those on *Auxiliary Reduction*.

there are no double contractions of the type **John'sn't* (only *John's not* and *John isn't*) or **we'ren't* (only *we're not* and *we aren't*). The condition that ## precede the vowel to be deleted prevents the rule from reducing sentence-initial auxiliaries, even when unstressed. In dialects in which *was* and *were* are not subject to *Glide Deletion*, the exclusion of these forms from the domain of *Auxiliary Reduction* is automatic. In other dialects, *Auxiliary Reduction* would appear to be sensitive to the distinction between those forms that readily undergo *Glide Deletion* and those that are subject to the rule only in very fast speech.

Although the application of *Glide Deletion* to forms beginning in [h] or [w] is a necessary condition for the application of *Auxiliary Reduction* to these forms, it is not a sufficient condition, since *Auxiliary Reduction* does not affect words like *him* and *his*, even unstressed and in fast speech; *Those who know him have loved him* can be contracted to [ðòwz uw nów m əv ləvd m], but the first *him* must maintain its syllabicity: *[ðòwz uw nówm əv ləvd m] (note that the further reduction is not at all difficult to pronounce). The restriction is that the only forms subject to the rule are [+auxiliary] forms, where the feature [±auxiliary] is assigned as required by independent facts having to do with word order. In this assignment, all uses of *be* bear the feature [+auxiliary], whereas only certain uses of *have* bear this feature. Thus, *is* contracts in all of its uses: e.g. progressive *be* (*He's going*), passive *be* (*He's criticized every day*), *be* of identity (*January's the first month of the year*), *be* of obligation (*He's to go right away*), and predicative *be* with following adjective (*He's sick*), noun phrase (*He's a farmer*), adverbial of place (*He's in town*, *He's from Idaho*), or adverbial of time (*The concert's tonight*).⁹ The uses of *have*, on the other hand, fall into three classes: perfective *have*; the main verb *have* in its central senses of possession, location, availability, and the like; the main verb *have* in various restricted, idiomatic, or derived usages (e.g. *have* 'hold, give' in *He has a party every night*, *have* 'give birth to' in *She has a baby every twelve months*, *have* of obligation in *I have to write a letter*, causative *have* in *Mildred has Frank pick her up every day at noon*). Forms of perfective *have* contract freely (*He's been looking at that*, *He's been hurt*), forms of *have* in its central senses do not normally¹⁰ contract in my dialect, although they do in some British dialects (**He's some money left*, **I've a wart on my nose*, **Cecilia'd a car at her disposal*), and the forms of *have* in its special senses do not contract at all (**He's a party every night*, **She's a baby every twelve months*, **Mildred's Frank pick her up every day at noon*).

This division of *have* into three classes of senses on phonological grounds correlates with a well known classification on the basis of whether *have* or *do* (or both) occurs in the tags of tag questions (and on the basis of related facts concerning Subject-Verb Inversion, the placement of NEG, etc.). Perfective *have* is tagged only by *have* (*He*

⁹ One case is not quite so clear. It seems to me that to the question *Who is the king?* the response *George the Second's the king* is natural, but that ?*The king's George the Second* is questionable, although the uncontracted versions, *George the Second is the king* and *The king is George the Second*, are both acceptable.

¹⁰ The contraction is somewhat more acceptable in the environments which especially favor *Glide Deletion*. ?*I've nó money left at all* is better than **I've a little money under the mattress*.

*has been looking at that, hasn't he?/*doesn't he?*), *have* in its central senses occurs with both tags (*He has some money left, hasn't he?/doesn't he?*, *I have a wart on my nose, haven't I?/don't I?*, *Cecilia had a car at her disposal, hadn't she?/didn't she?*), and *have* in its special senses is tagged only by *do* (*He has a party every night, *hasn't he?/doesn't he?*, *She has a baby every twelve months, *hasn't she?/doesn't she?*, *Mildred has Frank pick her up, *hasn't she?/doesn't she?*).

The fact that these familiar syntactic phenomena have phonological correlates occasions some difficulties for the treatment of *have* and *be* suggested by Bach (1967). He proposes that both *have* and *be* are introduced by transformational rule, so that the distinction between different types of *have* (also *be*) is determined by whether it happens to have been inserted under the node Aux or under the node Predicate. Aside from the problem that only two types of *have* are thereby distinguished without special devices, there is the difficulty that in Bach's analysis perfective *have* is differentiated from main verb *have* in the same way that progressive and passive *be* are differentiated from predicative *be*, namely by the dominating node. In consequence, *Auxiliary Reduction* must somehow be made applicable to *have* only when it is dominated by Aux, but to *be* regardless of the dominating node. What seems to be required is a pair of ad hoc rules, one marking all occurrences of *be* as [+auxiliary], the other marking *have* as [\pm auxiliary] according to whether or not it is dominated by Aux. Whatever special device is the appropriate one within Bach's framework, the fact that some such device is required undermines the principal support for his insertion analysis, which is that it treats all uses of *have* (similarly, all uses of *be*) as arising from a single source, thereby explaining, rather than merely noting, the appearance of the "same" verb in disparate functions.¹¹

One further preliminary remark on *Auxiliary Reduction*: the application of this rule is a necessary condition for the application of a rule I shall call *Phonetic Laxing*, which sends [i:y e:y u:w] to [i e u], and [a:y a:w] to [ay aw].¹² *Phonetic Laxing* applies only to pronominal forms ending in vowels (*he, she, we, me, they, you, who, I, why, how*) when these forms are followed by a contracted auxiliary other than [z] (from *is* or *has*). There is considerable dialectal variation with respect to this rule; some speakers do not have it at all, others have it in only a few forms. I supply here brief comments on my own speech, in which the following occur: [hi:y d go:w ~ hid go:w] *He'd go*, but not *[hi (w)ud go:w] *He would go*; also [ðe(:y)l si:y] *They'll see*, [hu(:w)m a:y tə si:y] *Who'm I to see?*, [a(:)ym šu:wr] *I'm sure*, [ha(:)wɔ̃ du:w it] *How did you do it?* *Phonetic Laxing* does not apply to nonpronouns, even when they are of the same phonological shape as pronouns; compare [ðed go:w] *They'd go* with *[ked go:w] *Kay'd go*. Nor does it apply before [z]: [ši:yz go:wɪŋ] *She's going*, not *[šiz go:wɪŋ].¹³

¹¹ Related, but unformalized, proposals are made in Lyons (1967).

¹² Indications of vocalic length are provided only in this short discussion of *Phonetic Laxing*.

¹³ I do not exclude the possibility that rather than there being a rule *Phonetic Laxing*, the independently required rule *Final Tensing* (which tenses the underlying lax vowels at the end of words like *radio, kinkajou*, and

3. Restrictions on Auxiliary Reduction: Preceding Context

The reduction of *is* and *has* takes place regardless of the nature of the preceding word: *Who's Pete seen?*, *The man I told you about's here*, *What I say's no business of yours*, *Neither Gloria nor Godfrey's ever been to Pakistan*, *The man I told you about that Jerry said he was going to send his review to's going to answer your question*, *I've always known that Sam's crazy*. Note that reduced *is* and *has* are realized as [s z iz] (*Dick's/John's/Butch's here*), in the same way as the third singular present ending of verbs and the genitive and plural endings of nouns.¹⁴ The occurrence of [s] for [z] is the result of a straightforward rule *Progressive Voicing Assimilation*. The maintenance of a syllabic in [iz] might be explained either by a restriction on *Auxiliary Reduction* or by a vowel insertion rule applying after *Auxiliary Reduction*, and the choice between these two analyses does not affect the discussion immediately following, although I shall return briefly to the question later.

It is natural to suppose that just as the reduced forms of *is/has* correspond to the [s z iz] inflectional endings, so the reduced forms of *would/had* would correspond to the [t d id] inflectional endings, the regular past tense and past participle endings. But although *would/had* contract after vowels—*He'd go*, *Mary'd go*, *Anyone who knows Sue'd go*, *Who'd gone?*, *Kermit and Kay'd gone by the time we arrived*—they contract in no other contexts: **John'd* [jʌnd], **Sam'd* [sæmd], **Bill'd* [bild], **the mob'd* [ðə mabd]. The worst cases are those in which both *Auxiliary Reduction* and *Progressive Voicing Assimilation* would apply: **Russ'd* [rʌst], **a bush'd* [ə buʃt], **Pop'd* [papt]. (Some cases with [r] are marginal: ?*The car'd been destroyed*, ?*Homer'd go if you let him*.)

The restrictions on contraction of the remaining forms (*will*, *have*, *am*, *are*) are even more severe. First, *Auxiliary Reduction* does not apply to these forms after non-pronouns, even those ending in vowels: **Sue'll* [suwl], *Diana'll* [dayænəl], **the foci've* [ðə fowsayv], **the car'll* [ðə karl], **the phenomena're* [ðə fənamənər]. Next, it does not apply after some pronominal forms: **how'm* [hawm], as in *How am I to answer?*,

broccoli—see Chomsky and Halle 1968, 74f.) is blocked from applying because of the clitic [d l r m v], just as it would also be blocked by the *-m* of *him* and *them*. This treatment would require that all the listed pronouns except *I*, *why*, and *how* have underlying lax vowels and not undergo the vowel shift. The required ordering of rules would be *Glide Deletion*, *Auxiliary Reduction*, and *Final Tensing*. *Final Tensing* would have to be obligatory before clitic [z] and in nonpronouns with clitics, but optional before clitic [d l r v m]. To achieve this effect without cluttering up *Final Tensing*, we must postulate a rule (ordered between *Auxiliary Reduction* and *Final Tensing*) which optionally replaces the # boundary between the final vowel of a pronoun and a following clitic [d l r v m] by a + boundary. This rule is a point-by-point analogue of *Phonetic Laxing*. Both treatments create difficulties in the description of the diphthongization of tense vowels.

¹⁴ There is, however, a difference between reduced *is/has* and the genitive ending: the genitive ending is subject to a length-and-complexity constraint, but reduced *is* and *has* are not. Compare **The man I told you about that Jerry said he was going to send his review to's brother will answer your question* with the similar example in the text. The length-and-complexity constraint applies to a syntactic rule involved in the derivation of the genitives; no such rule is involved in the reduction of *is* and *has*.

The essential identity of the reduction of *is/has* and the selection of the genitive ending is noted by the compendious grammarians (see, e.g. Jespersen 1942, 252f.). That the form of the contraction rule provides evidence about the underlying form of the genitive ending was first pointed out to me by R. P. V. Kiparsky and has recently been emphasized by Luelsdorff (1969).

**where'll* [weyrl], as in *Where will you go?*, **me're* [miyr], as in *Those who know me are surprised*, **her'll* [hrl], as in *Those who know her will be surprised*. Thus, it seems that the rule applies to these forms only after *I, you, he, she, we, they, and who* (e.g. *I'm, you've, he'll, we're, who'll*). Yet *Auxiliary Reduction* fails to apply after these forms when they are the last nouns in coordinate subjects—*You and I have* (*[ayv]) *gone there once too often*, *Grace and you will* (*[yuwl]) *like it in Manitoba*, *Neither we nor they have* (*[ðeyv]) *been very pleasant about it*—or the final words in relative clauses—*Everyone who hears you will* (*[yuwl]) *be impressed*, *The two men who said it was they are* (*[ðeyr]) *arriving on the midnight plane*—or the final words in embedded complements—*The fact that it was she will* (*[šiyl]) *be a blow to the party*, *Knowing who will* (*[huwl]) *help us*, *To see you will* (*[yuwl]) *be nice*—or the final words in various types of reduced relatives—*All the residents but you have* (*[yuwv]) *painted their houses*, *The guy next to you will* (*[yuwl]) *speak first*, *Anyone saying it was I will* (*[ayl]) *be in deep trouble*, *The ones knowing who are* (*[huwr]) *going to be closely questioned*, *The tallest of you are* (*[yuwr]) *being shipped off to Frederick the Great*, *A man as tall as he will* (*[hiyl]) *probably be shipped off to Frederick the Great*.

The correct generalization is that *Auxiliary Reduction* applies to *will, have, am, and are* only after one of a small set of pronominal forms (not quite, as we shall see, the set of forms given in the previous paragraph), and then only when these NPs are immediately dominated by an S. It may be significant that this S is always the one to which the auxiliary belongs (where a node X is said to BELONG TO an S if that S is the lowest S dominating X),¹⁵ although I know of no cases in which it is NECESSARY to require that this be so (and, because of the cases with coordinate subjects and those with reduced relatives, the belonging condition is not sufficient by itself). Note also that, because of the cases with coordinate subjects and those in which the embedded clauses are equative, it would not be sufficient to require that the pronouns be nominative rather than accusative, even though in some of the examples with *you* the difference in case happens to correspond to a difference in acceptability.

An attractive alternative to the restriction in terms of immediate dominance is the following: the reduction occurs only when the pronoun is the complete subject of the auxiliary. This condition would cover all the examples given above, but there are further facts that indicate that the first formulation of the condition is correct. Crucial evidence is provided by sentences like *Who have you seen?* and *Who will you see?*, where *who* is an object, in contrast to *Who will see it?*, where *who* is the subject. I find the contractions acceptable in all three sentences—[huwv yuw siyn], [huwl yuw siy], [huwl siy it]—contra the formulation in terms of complete subjects. These facts are confused by the relative unacceptability (to me, at least) of contracted *am* in similar environments: *Who am* (?[huwm]) *I to see?* But the reduction of *am* (except after *I*) is, in general, less acceptable than the reductions of *have, will, and are*; for notice that

¹⁵ The relation BELONG TO also functions as an auxiliary concept in the definition of the relation COMMAND discussed by Langacker (1969): node X commands node Y if X belongs to an S that dominates Y.

although ?*who*'m is paralleled by **how*'m, already cited, and **why*'m (*Why am I to do this?*), the contracted forms *who've* and *who'll* are paralleled by the contractions in sentences like *How'll you ever finish that?*, *Why're you staring at her?*, *Why've they given up so soon?*¹⁶ *How* and *why*, though pronominal in some sense, can hardly be subjects in these examples. Note that the reduction of *have*, *will*, and *are* takes place before any pronominal form ending in a vowel (subject to the dominance condition).

I now restate the rule *Auxiliary Reduction*, incorporating the observations of this section:

$$\begin{array}{ccccccc}
 [&] & \#\# & \left[\begin{array}{c} \text{V} \\ - \text{tense} \\ - \text{stress} \\ + \text{auxiliary} \end{array} \right] & [+ \text{cons}] & \#\# & \\
 \text{I} & & 2 & 3 & 4 & 5 & \Rightarrow \\
 \text{I} & & \# & \phi & 4 & 5 &
 \end{array}$$

Restrictions

- (a) If 4 is not [z], then 1 is a vowel;
- (b) if 4 is not a coronal obstruent ([z] or [d]), then 1 is a segment of a pronominal NP immediately dominated by S;
- (c) if 4 is [m], then 1 is a segment of the pronoun *I*.

A more informal statement of the restrictions is that there are four classes of auxiliaries undergoing reduction—(i) *is* and *has*, (ii) *would* and *had*, (iii) *have*, *will*, and *are*, and (iv) *am*—and that the reduction takes place only after vowels for classes (ii) through (iv), only after pronouns immediately dominated by S in classes (iii) and (iv), and only after the specific pronoun *I* for class (iv). The differentiation of the classes by the final segment of the auxiliary ([z], [d], [v l r], [m]) is adopted here with some misgivings, in the absence of any satisfying explanation for the rather peculiar distribution of the forms into the four classes. Another basis for the distribution, namely that the class (i) forms contain the third singular present morpheme, the class (ii) forms the past morpheme, and the class (iii) and (iv) forms neither, seems equally arbitrary.

One further revision of *Auxiliary Reduction* has some support. It is not unreasonable to suppose that the optional rule *Auxiliary Reduction* merely makes the auxiliary clitic to the preceding word, by reduction of the intervening $\#\#$ to $\#$.¹⁷ The deletion of the vowel would then be accomplished by an obligatory rule also operative in the plurals of nouns, the past tense of verbs, etc. In this framework, the restrictions discussed in the present section continue to be conditions on *Auxiliary Reduction*, not on the vowel-deletion rule (because of the differences between the treatment of *would/had* and the

¹⁶ *Have* contracts even after *where*, as in *Where've* [wɛrv] *you been?* This example is the more remarkable in that *would* and *had* do not contract after *where*: **Where'd he gone?*, **Where'd you go if you had a chance?* *Where'd* in the grammatical *Where'd he go?* is reduced from *where did*, not *where would*.

¹⁷ Some general convention is then required to make the necessary adjustments in superficial constituent structure.

treatment of the past tense morpheme), and the inflectional endings must be set up with underlying forms /Vz/ and /Vd/, where V is some lax vowel (cf. Luelsdorff 1969).

4. Restrictions on Auxiliary Reduction: Following Contexts.¹⁸

Consider the following examples, all containing unacceptable contractions of *is*: **Tell me where the concert's this evening* (cf. *The concert's in Royce Hall this evening*), **I just realized how happy Kurt's these days* (cf. *Kurt's very happy these days* and *I just realized how happy Kurt's been these days*), **Do you know who the king's now?*, **Bert is more distinguished than Jean-Claude's* (cf. *Bert is more distinguished than Jean-Claude's ever been*), **Herman is as fond of peanuts as Gloria's of almonds* (cf. *Herman is as fond of peanuts as Gloria's enamoured of almonds*), **Fafnir is nasty when you tickle him, and Fasolt's when you tell jokes*, **Bruce is thin, and Thelma's too* (cf. *Bruce is thin, and so's Thelma*). Similar examples are easily constructed for other contracted forms.

It is clear that the failure of *Auxiliary Reduction* to apply in these cases has nothing to do with the preceding context. It might seem that the stress on *is* is too heavy for the contraction rule to apply, even though it can scarcely be maintained that the principles that predict these occurrences of relatively heavy stress are familiar. I shall argue, however, that the correct explanation does not depend upon stress considerations.

Consider first some cases in which failure to contract correlates with relatively heavy stress, for instance **Tell me where the concert's this evening*, where *is* in *Tell me where the concert is this evening* bears a major stress. Here, as in **I just realized how happy Kurt's these days*, **Do you know who the king's now*, and **I wonder where Sparkman's now*, *is* bears stress because it is the last constituent within the VP, other material that originally followed *is* having been removed by transformational rule, and adverbs of the type *this evening*, *these days*, and *now* not falling within the VP (see Chomsky 1965, 101f. and Lakoff and Ross 1966). But note that the stress on *is* in examples like *I wonder how tall he is* (**he's*) is not very heavy.

Similar explanations can be offered for **Bert is more distinguished than Jean-Claude's* and **Fafnir is nasty when you tickle him, and Fasolt's when you tell jokes*, but not for **Herman is as fond of peanuts as Gloria's of almonds*, where *almonds* bears the major stress in its VP (and, in fact, in the entire sentence), or for the contrast between **Bruce is thin, and Thelma's too* and *Bruce is thin, and so's Thelma*, where *Thelma is too* and *so is Thelma* have identical stress patterns. In fact, *Glide Deletion*, which has already been noted to be dependent on stress, can apply in some examples where *Auxiliary Reduction* cannot: *Tweedledum has gobbled more oysters than Tweedledee (h)as* versus **Tweedledum has gobbled more oysters than Tweedledee's* (and cf. *Tweedledum has gobbled more oysters than Tweedledee's consumed clams*); similarly, *Gerda has been to North Dakota as often as Trudi (h)as to Arkansas*

¹⁸ The central data in this section were pointed out to me by George Lakoff and J. R. Ross, and the explanation of them first suggested by Harold King (see King 1970).

versus **Gerda has been to North Dakota as often as Trudi's to Arkansas*. In my speech the vowel of *has* in these examples is reducible, so that *has* may appear as [əz], but not as [z] (there are speakers of English who disagree with me on this point).

The starred examples considered thus far, with the exception of the contrast between *Thelma is too* and *so is Thelma*, have a common property besides the (rather inconstant) occurrence of a major stress on the vowel to be deleted: in every case, the constituent following the auxiliary form has been deleted or moved away. Several different transformational rules are responsible for these deletions and movements—a rule which fronts questioned constituents, as in *I wonder how tall he is* (**he's*), and exclamatory phrases, as in *How tall they are!* (**they're!*); some rule or rules reducing comparative and equative clauses, as in *I am more evil than he is* (**he's*) and *He is at least as evil as I am* (**I'm*); a rule Gapping (see Ross 1967) yielding sentences like *I am nice to Leda, and you are* (**you're*) *to the swan* and *I am as nice to Leda as you are* (**you're*) *to the swan*; a rule VP Deletion (see Ross ms. 1967) generating sentences like *Mike is building a house, and Tom is* (**Tom's*) *too* and *Akira is tall for a Japanese, and Samoset is* (**Samoset's*) *for a Mic-Mac*; various rules generating other tags, as in *Horace said that his brother is seven feet tall, and so he is* (**he's*)/*and that he is* (**he's*)/*and he is* (**he's*) *that/which he is* (**he's*); and a topicalization rule, as in *A great man my father is* (**father's*). It seems that *Auxiliary Reduction* is barred from applying to a form when the constituent following that form has been removed.

This is not to say that stress is not a factor in the conditioning of *Auxiliary Reduction*, only that the no-deletion condition seems to be required independently of the stress restrictions. A case in which stress restrictions are clearly operative is the distinction between *How is* (*how's*) *the weather in Boston?* and *How is* (**how's*) *it in Boston?* where *is* in the second sentence receives greater stress because of the stresslessness of pronouns like *it* (however these facts are to be represented in a description of English phonology).

An unsolved problem is the contrast between the behavior of inverted auxiliaries in questions and tags, as in *Who has* (*who's*) *Pete seen?* and *I'm going, and so is* (*so's*) *Pete*, and their behavior after preposed negatives, as in *Nobody has* (**nobody's*) *Pete seen* and *Never has* (**never's*) *Pete seen her*. Note that a careful statement of the no-deletion condition must distinguish between cases in which a constituent following the auxiliary is moved and cases in which the auxiliary itself moves. In any event, the no-deletion condition is inoperative here, and reference to stress levels will not explain the contrast either, since a perfectly normal pronunciation of *Never has Pete seen her* is [nevɹ əz piyt siynɹ], with a reduced and unstressed *has*.

References

- Bach, E. (1967) "Have and Be in English Syntax," *Language* 43, 462-485.
 Bierwisch, M. (1966) "Regeln für die Intonation Deutscher Sätze," *Studia Grammatica* 7, 99-201.

- Bierwisch M. (1968) "Two Critical Problems in Accent Rules," *Journal of Linguistics* 4, 173-178.
- Chomsky, N. (1965) *Aspects of the Theory of Syntax*, MIT Press, Cambridge, Mass.
- Chomsky, N. and M. Halle (1968) *The Sound Pattern of English*, Harper & Row, New York.
- Jespersen, O. (1942) *A Modern English Grammar [on Historical Principles], Part VI, Morphology*, George Allen & Unwin, London.
- King, H. V. (1970) "On Blocking the Rules for Contraction in English," *Linguistic Inquiry* 1.
- Lakoff, G. P. (Ms. 1968) "Pronouns and Reference."
- Lakoff, G. P. and J. R. Ross (1966) "A Criterion for Verb Phrase Constituency," in *Mathematical Linguistics and Automatic Translation, Report NSF-17*, the Computation Laboratory of Harvard University, Cambridge, Mass.
- Langacker, R. (1969) "Pronominalization and the Chain of Command," in S. Schane and D. Reibel, eds., *Modern Studies in English*, Prentice-Hall, Englewood Cliffs, N.J.
- Luelsdorff, P. A. (1969) "On the Phonology of English Inflection," *Glossa* 3, 39-48.
- Lyons, J. (1967) "A Note on Possessive, Existential, and Locative Sentences," *Foundations of Language* 3, 390-396.
- McCawley, J. D. (1968) *The Phonological Component of a Grammar of Japanese*, Mouton, The Hague.
- Pike, K. L. (1947) "Grammatical Prerequisites to Phonemic Analysis," *Word* 3, 155-172.
- Pike, K. L. (1952) "More on Grammatical Prerequisites," *Word* 8, 106-121.
- Postal, P. M. (1968) *Aspects of Phonological Theory*, Harper & Row, New York.
- Ross, J. R. (Ms. 1967) "Auxiliaries as Main Verbs."
- Ross, J. R. (1967) "Gapping and the Order of Constituents," read at the Tenth International Congress of Linguistics, Bucharest.
- Sivertsen, E. (1960) *Cockney Phonology*, Oslo University Press, Oslo.
- Vennemann, T. (1968) "On the Use of Paradigmatic Information in a Competence Rule of Modern German Phonology," read at the summer LSA meeting, Urbana, Ill.
- Zwicky, A. M. (to appear) "Note on a Phonological Hierarchy in English," in R. P. Stockwell, ed., *Historical Linguistics in the Perspective of Transformational Theory*, Indiana University Press, Bloomington, Indiana.

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