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## Juncture and the Phonology of Auxiliary Reduction in English

Peter Sells

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JUNCTURE AND THE PHONOLOGY OF AUXILIARY REDUCTION IN ENGLISH\*

Peter Sells

0. INTRODUCTION

The focus of this paper is the correct characterization of the phenomenon in English of auxiliary reduction, to which I will refer by the term 'contraction', such as we find in the examples in (1):

- (1) Fred's leaving.  
What's the matter?  
That man's got no shoes on.

I shall use the term contraction to refer to that process which leaves an auxiliary verb such as is or has as a non-syllabic consonant, realized phonetically as [s] or [z]. There have been various attempts in the generative literature to account for the distribution of the contracted forms, for -- as will be seen below -- the alternation between 'full' and contracted forms is not entirely free, by any means. Broadly, these accounts fall into two classes, which I will dub 'syntactic' and 'phonological'; the accounts presented in Selkirk (1972) and Selkirk (to appear) -- I will refer to the latter work as simply 'Selkirk' henceforth -- are essentially phonological in that the contraction is effected by rules operating on phonological representations. The account presented in Zwicky (1970), the first in-depth generative treatment of the topic, also falls into this class.

On the other hand, it has been argued that auxiliary contraction is best characterized synchronically by rules that refer solely to syntactic structure; this is the position of, for example, Bresnan (1971), Akmajian, Steele & Wasow (1979), Wood (1979), Zagana (1982) and Kaisse (1983) -- henceforth 'Kaisse'. In this last work, the contracted form 's is listed lexically and the conditions on its distribution are essentially conditions on lexical insertion. I will discuss Kaisse's proposal in some detail in section 6 below.

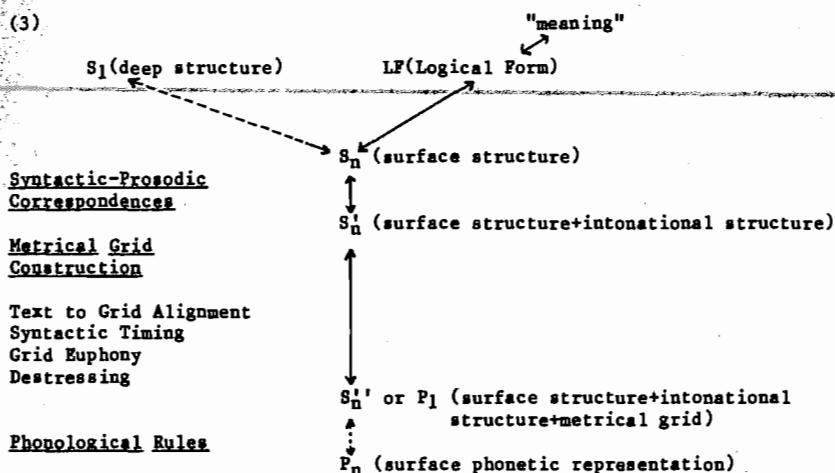
Part of the motivation for a syntactic account of contraction stems from the fact that only a small class of words in involved, specifically the tensed auxiliaries, as observed for example in Selkirk (1972, section 2.3), Gazdar, Pullum & Sag (1982, 627). While such a class is certainly specifiable (morpho-)syntactically, it does not appear a natural class for some phonological rule to refer to. Moreover, that there is any synchronic process at all that contracts auxiliaries from their full forms is not supported by all the facts; for example, sentences like (2a) are perfectly natural in spoken English, but the putative source (2b) is ungrammatical:

- (2) a. There's three cars in the garage.  
b. \*There is three cars in the garage.

This example is from Steele et al. (1981, 291). Clearly the only source for (2a) involves a listed form there's which is blind to number-agreement.

The purpose of this paper is to argue that there is indeed a synchronic process of auxiliary contractions -- pace exceptional examples like (2a) -- and that the process is phonological in nature, despite its restriction to a very small class of items. In the main body of the paper I will present the account I envisage, and in section 6 compare it to other accounts, especially Kaisse's; my conclusion is that no syntactic account of contraction can do full justice to the facts, in that the process of contraction is critically sensitive to information that is purely phonological. While the account I present may not be entirely correct, I think that the general conclusion that the milieu in which contraction operates is the phonological part of the grammar is inescapable.

The theoretical framework I will presuppose here is that of Selkirk (to appear); syntactic structures are interpreted by a phonological component, as has generally been assumed since Chomsky & Halle (1968) (henceforth SPE). However, Selkirk's framework differs from that of SPE in several ways. The overall organization of the grammar is as shown in (3) (= Selkirk Ch. 1, Fig. 2):



Unlike the SPE system, the underlying phonological representation is not simply the surface structure interpreted by the stress rules; rather, surface structures are first assigned intonational structure, and that structure is then interpreted by the stress rules, which involve the construction of metrical grids, as advocated by Selkirk, and Prince (1983). The metrical grid also provides a representation of phonological (dis-)juncture, to which phonological rules are sensitive; this junctural representation replaces the boundary-system of SPE -- arguments for the superiority of a junctural description of the constraints on the operation of phonological rules over a boundary-based one can be found in Rotenberg (1978), Selkirk (1980), and Selkirk (to appear) discusses the motivation for representing juncture in this particular way.

I will show in the following sections that the hypothesized rule of contraction is juncturally-sensitive, and therefore is properly construed as a phonological rule. This in itself is not enough to argue against a syntactic account of contraction, for the rules that build up the representation of juncture as part of the Metrical Grid Construction interpret syntactic structures in determinate ways -- so there is, other things being equal -- a direct mapping from syntactic structure to junctural representation. What does make the syntactic account much less attractive is the fact that this mapping is not direct due to the intervention of intonational factors introduced in the Syntactic-Prosodic Correspondences, which affect the representation of disjuncture in ways that are not predictable from the syntactic structure alone. It is a feature of Selkirk's system that the relation of syntactic structures to prosodically interpreted structures is one-to-many; information present at  $S'_n$  is strictly recoverable at the level  $S_n$ , in terms of annotated "F" markings (as in Jackendoff (1972)) which specify the focused items in the syntactic structure. The assignment of  $F_s$  at  $S_n$  corresponds to the assignment of pitch-accents at  $S'_n$  (the idea of representing intonation contours as series of pitch-accents is developed in Pierrehumbert (1980)); however, if, as I will argue, contraction is sensitive to information introduced in the Syntactic-Prosodic Correspondences, which finds its representation (as disjuncture) only at level  $P_1$ , then a syntactic account of contraction must appeal to the assignment of  $F_s$  in order to correctly describe the facts. At best then, a syntactic account would characterize the distribution of contracted forms by conditions on the assignment of  $F_s$  to surface structures; I will argue in section 6 that such an account would compare unfavorably to the corresponding phonological account both in terms of simplicity of formulation and, more importantly, depth of explanation. In the immediately following sections, I take up the formulation of such a phonological account.

#### 1. ORIENTATION

In (4) below I give representative examples of the entire range of contraction, including other auxiliaries besides is/has; in (5) I give a list of the full, reduced, and contracted forms:

- (4) a. Fred is the man for the job.  
 b. Fred's the man for the job.  
 c. You will see me tomorrow.  
 d. You'll see me tomorrow.  
 e. How am I supposed to know?  
 f. How'm I supposed to know?  
 g. We had been waiting a long time.  
 h. We'd been waiting a long time.

(5) Reduced and Contracted Forms

	reduced	contracted
a. is, has	[ɪz], [ðz]	[s], [z]
b. had, would	[əd]	[d]
c. are	[ɹ]	[r]
d. am	[əm]	[m]
e. have	[əv]	[v]
f. will	[ɪ]	[ɪ]

Zwicky (1970) observed that only the forms is/has regularly undergo contraction (I will discuss the use of 'regularly' immediately below) on to a wide range of hosts (where the host is the preceding word the auxiliary appears enclitic on)<sup>1</sup>. The reduced forms of the auxiliaries are still syllabic, and it is assumed are derived from underlying full, stressed, forms by reduction rules of phrase phonology -- this much is, I think, uncontroversial. The necessity that the underlying forms be stressed is discussed in Selkirk, Ch. 7; contraction renders the reduced form non-syllabic, giving the forms in the right-hand column of (5).

The nature of the host for the contracted forms of is/has will be discussed in detail below; the other forms (5b-f) are much more restricted: they can only appear in their contracted forms when the host is a non-conjoined, monosyllabic, personal pronoun, including interrogative pronouns. Compare the (a) and (b) examples below:

- (6) a. You'll do it. [ju:l...]  
 b. Sue'll do it. [su:əl...]
- (7) a. Who'd have guessed it? [hu:d...]  
 b. Bob'd have guessed it. [bɑbəd...]  
 (cf. She bobbed her hair. [bɑbd...])
- (8) a. They'll leave. [θe:l...]  
 b. Gray'll leave. [gre:əl...]
- (9) a. I've been chosen [ajv....]  
 b. You and I've been chosen. [ənaɪəv...]

As the orthography does not distinguish cases of reduction and contraction, as it merely represents loss of initial [h] or [w], I will give transcriptions of the pronunciations. For my speech, the forms in (5b-f) form a class in that they are only contracted in the (a) environments above; for some speakers, as noted in Zwicky (1970), had/would is a little freer, and can appear contracted in examples such as in (10):

- (10) Sue'd done it.  
 The foci'd been altered.  
 Sue'd have done it.  
 Gray'd be the best choice.

I will not explicitly treat such examples here, although they would find a ready explanation in the system I propose. Steele et al. (1981) also claim that some speakers have the alternation shown in (11):

- (11) a. What does he do for a living?  
 b. What's he do for a living? [wats...]

The (b) example here is completely impossible in my speech, and again I will omit such examples from the discussion.

Now not all the auxiliaries have contracted forms, though they all have reduced forms. Specifically, the rule gliding initial [h] or [w] -- Zwicky's 'Glide Deletion' -- in had, has, have, would, will, does not apply to was, were, whose reduced forms are simply [wɒz], [wə]. It is therefore not possible to formulate glide deletion without reference to the forms to which it may apply.

However, such a rule does seem to have some status in the language, conditioned largely by familiarity, for instance, the names in (12) show such effects:

- (12) a. Birmingham                      b. Sewell  
          Amherst                              Berwick  
          Needham                              Norwich  
          Binghampton                      Alnwick [æ'nɪk]

Consider Berwick; in some American dialects, it is pronounced [bɜːrwɪk]; in British English, it is [bɛrɪk]. The loss of the initial glide is, of course, dependent upon prior destressing of the syllable of which it is the onset (a full discussion of the conditions on the rule is given in Zwicky (1970)). The rule operates with more regularity in faster speech or familiar forms; the pronunciation of Amherst is a good example -- locally, it is [æmhɛrst] whereas almost without exception the non-local pronunciation is [æmhɪrst].

With regard to the auxiliaries, we can formulate the rule as in (13), and specify that it applies to particular forms -- these forms are then honorarily 'familiar':

(13) Glide Deletion

$$\left\{ \begin{array}{c} h \\ w \end{array} \right\} \rightarrow \emptyset / \text{---} \begin{array}{c} \sigma \\ \vdots \\ x \end{array} \text{ where } \sigma = \text{has, had, have, will, would.}$$

The requirement that the syllable be unstressed is represented here in terms of the metrical grid alignment (Prince (1983), Selkirk) to a single x. The single x gives the information that the syllable is not stressed; stress is represented so:  $\bar{x}$ . All the auxiliaries, being non-lexical items, are susceptible to destressing under certain conditions (see Selkirk (1972), and (to appear, Ch.7), for full discussion). Destressing reduces a  $\bar{x}$  that has previously been assigned to a syllable by the stress rules to a single x; (13) takes syllables so aligned as its input. The fact that the syllable must be destressed is easily seen. The full form of has ([hɔz]) has a reduced form [həz] which feeds (13), but there is not possible form \*[æz] (standardly at least).

I will return to the other contracting auxiliaries besides is/has in section 3; until then, I will concentrate on just these forms. Selkirk (1972) observed that only when the auxiliary is in a position where it might destress is it also susceptible to contraction; so only the full form is possible in (14):

- (14) a. I'm as tall as Bill is. [ɪz], \*[əz], \*[z]  
 b. I'll have what Bill has. [hæz], \*[əz], \*[z]

Yet contraction is not possible in all destressing environments; in (15), the vowel is reduced to schwa, symptomatic of prior destressing, but contraction cannot occur.

- (15) a. No way [əz] he gonna do that.  
 b. Only at night [əz] it possible to get KUOW on my radio.

(These examples from Kaisse.) The conditions on destressing are dependent on the following context of the auxiliary; for example, when the auxiliary is phrase-final, as in (14), destressing is not possible. What the examples in (15) show is that preceding context is relevant too -- that the nature of the host is a relevant factor. For instance, the phrases no way and only at night are not subjects in (15), and this seems to affect the possibility of contraction. The nature of the potential host for contraction is the principal object of the investigation of this paper, an investigation which begins in the next section.

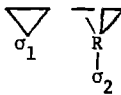
To conclude the current section, I will present an outline of the steps I am hypothesizing are involved in the derivation of Pete's (gone) from an underlying form Pete has gone.

- |   |  |     |     |
|---|--|-----|-----|
| (16)  |  | x   |     |
|   |  | x   | x   |
| a. after stress rules                               |  | pit | hæz |
|   |  | x   |     |
| b. destressing                                      |  | pit | hæz |
|   |  | x   | x   |
| c. vowel reduction/<br>glide deletion (13)          |  | pit | əz  |
|   |  | x   |     |
| d. contraction                                      |  | pit | z   |
|   |  | x   |     |
| e. resyllabification <sup>2</sup> /<br>assimilation |  | pit | s   |

The rule (16d) called 'contraction' deletes the schwa, leaving a floating rime which gets syllabified into the rime of the host; a discussion of the syllabification process can be found in section 3 below. For now -- and this will be revised slightly in the next section -- we can think of the contraction rule itself as deleting schwa in auxiliaries:

(17) Contraction

$\partial \rightarrow \emptyset /$



where  $\sigma_2$  is an auxiliary verb

The condition that there be a preceding syllable  $\sigma_1$  is required due to the following facts observed in Palmer (1965); initially, an auxiliary can be destressed but must remain syllabic

- (18) a. Have you seen him? [ $\partial vju: \dots$ ]  
 b. Has Pete gone yet? [ $\partial zpit \dots$ ]

In faster speech, the syllabic nucleus of the initial syllable in these cases can certainly disappear, e.g. [ $vj\partial s: \text{f} \text{nr} \text{m}$ ] for (18a); such facts led Bresnan (1971) to propose that contraction is effected by a rule (her Tense Contraction) procliticizing the auxiliary onto the following element. This approach is criticized in Selkirk (1972), to which the reader is referred for more discussion. It is notable however, that even in the cases in (18), the fast-speech forms still retain a silent upbeat, as we also find -- observed by Daniel Jones -- in the fast form of thankyou, [ $'kkyu$ ]. In (18a), the fast form is definitely [ $'vj\partial \dots$ ], and the loss of schwa may be attributed not to (17) but to a more general fast-speech tendency to drop out unstressed vowels.

2. THE PRECEDING CONTEXT

In this section I will show that contraction is properly construed as a phonological process, in that it is sensitive to phonological information; given the organization of the grammar in (3) above, contraction must follow the assignment of intonation contours -- represented as a series of pitch-accents -- as it is sensitive to these (or rather, to their effects on the whole phonological representation). The following example, from Kaisse is one where reduction is possible but contraction is not:

- (19) Speaking tonight is our star reporter. [ $\partial z$ ], \*[s]

I will suggest and then demonstrate that the blocking of contraction is due to the presence of a disjuncture between potential host and auxiliary, a disjuncture which phonological rules -- such as contraction -- are sensitive to. As described above, the representation of juncture utilizes the metrical grid; silent grid positions are added between words and phrases, as described in Selkirk, Ch.6. As the syntactic structure is interpreted phonologically (the interpretation is cyclic), silent demibeats (sdb) are added at the end of words and phrases, effectively 'setting-off' words in the string from others. The exact rules for sdb addition will be given below; for now, consider the effect on the representation if the rules were to add a silent demibeat (x) after every (a) lexical item and (b) major phrase. Ignoring the representation of prominence, the representation of (20a) would be as (20b); closed-class items do not count as lexical, and so do not get following xs by (a); and the 'major' phrases are taken to be those shown in (20a):

- (20) a. [the man<sub>NP</sub>][has been seeing [his mother<sub>NP</sub>] today vp]  
 b. the man xx has been seeing x his mother xx today xx



In this example, there is no disjuncture (there is 'junctural adjacency') between the and man, has and been and seeing, and his and mother; and the disjuncture between seeing and his is less than that between man and has and mother and today. As phonological rules are juncturally sensitive, one might expect to find a rule that operates over a disjuncture of zero or  $\underline{x}$ , but is blocked over  $\underline{xx}$ . For example, the English Rhythm Rule, as discussed by Prince and Selkirk, can apply between a verb and its object (one  $x$ ), but does not apply between subject and verb (two  $xs$ ). The contraction rule ((17) above) is also juncturally sensitive, and I will reformulate it as (21):

$$(21) \text{ Contraction } \partial \rightarrow \emptyset / \begin{array}{c} \sigma_1 \quad \underline{J} \quad \sigma_2 \\ \diagdown \quad \diagup \\ \sigma_1 \quad \sigma_2 \end{array}$$

where  $\sigma_2$  is an auxiliary verb, and  $\underline{J}$  is the maximal disjuncture over which the rule applies.

That is, if the disjuncture between  $\sigma_1$  and  $\sigma_2$  exceeds  $\underline{J}$ , the rule does not apply. To take an extreme example, we do not find contraction across an intonational phrase boundary, for instance:

- (22) a. Bill, I think, has felt this way all along. [əzfel't...]  
b. \*Bill, I think's, felt this way all along.

Two factors influence the disjuncture -- syntactic structure and prosodic structure, as reflected in the organization of the grammar (3) -- and therefore either or both may affect it in such a way as to block the application of (21). Presumably syntactic structure alone is enough in (22a) to create a sufficiently large disjuncture. Proposals in the literature such as Wood (1979), Zagana (1982), and Kaisse, suggest that syntactic structure alone is relevant for the determination of the contraction environments; however, the data is more complex than this, as examples such as (23) and (24) show:

- (23) a. WHICH coast's most easily reached?  
b. \*Which COAST's most easily reached?
- (24) a. That Tabby CAUGHT the rat's obvious; that he ate it isn't.  
b. \*That Tabby caught the RAT's obvious; that he got the mouse ian't.

Although the judgments are perfectly clear in these examples the effects of intonation introduce more delicate gradations of acceptability; in particular, fast and casual speech-styles allow certain phrase-phonological rules to apply more readily, and I will attempt to show where such factors may be interfering with the data I present. The variable application of rules relative to delivery is explained at least in part by the representation of disjuncture in terms of  $\underline{xs}$ , as discussed in Selkirk, Ch.6. The grid representation is a representation of relative prominence and duration, as is a score of a musical piece; the actual rate of performance is independent.

Suppose then that some phonological rule P is sensitive to a juncture in absolute time of  $p$  milliseconds; at a rate of speech production in which each  $\underline{x}$  represents  $p/2$  milliseconds, a disjuncture of  $\underline{xxx}$  or greater will block the application of P. However, if the production rate is increased by 50%, P will

now operate across xxx. In general, the data to be considered here are of the 'normal' cases of contraction, and so it is important to keep factors of style and delivery out of the data, wherever possible. The examples will in general be presented in contrastive pairs, allowing us to control for delivery -- if at some speech rate the one example is acceptable, no matter how fast that rate is, the other example should be correspondingly worse at that particular rate.

The unmarked case where we find contraction is where the auxiliary follows its subject; if either the syntactic structure or the prosodic is sufficiently 'marked' (syntactic parentheticals, displacements, heavy accenting, etc.), the possibility of contraction reduces (of course a marked syntactic structure is often accompanied by a characteristic, and marked, intonation contour). In the examples in (25) below, the (a) example has a gerund (NP-over-VP) in subject position; however, focusing -- and hence accenting -- the last item in that phrase renders the fairly natural contraction of (a) very unnatural; in the (c) example, the VP and subject have flipped around the verb be, creating a marked syntactic structure, and contraction is again highly unnatural:

- (25) a. Typing the book's the hardest part.
- b. \*No, typing the BOOK's the hardest part.
- c. \*Typing the book's our secretary Kathy.

So it must be on the view taken here that the value set for J in (21) is exceeded in the last two examples here, due to the marked nature of the structures.

For the exact representation of juncture, I assume the rules of sdb addition of Selkirk, Ch.6. The rules are given as (26):

(26) Silent DemiBeat Addition

Add a silent demibeat at the end (right extreme) of the metrical grid aligned with:

- (a) a word
- (b) a word which is the head of a phrasal argument or head constituent
- (c) a phrase
- (d) a daughter phrase of S

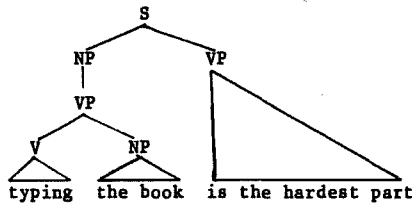
As suggested above, what counts as a 'phrase' for (c) is a 'major' phrase; I assume the analysis of auxiliaries given in Gazdar et al. (1982), in which each verb takes a VP complement. Although the syntactic structure of (27a) is as shown, I assume there is only one VP relevant to the phonology (the outermost one). The junctural representation produced by (26) is given as (27b), with the letters marking which part of (26) is responsible:

- (27) a. The man [vp must[vp have[vp been[vp leaving]]]]
- b. the man xxxx must have been leaving xxxx
- abcd                               abcd

The disjuncture between subject and VP is then typically 4 sdb's; I will refer to disjuncture numerically in this way. Given that contraction is possible in such a structure as (27a) -- as in The man's been seeing that woman again -- we know that J in (21) must be at least 4.

Contraction is also possible in (25a); the gross syntactic structure is given in (28):

(28)



Here  $J = 6$ ; the word book accounts for 2, being a word and a head of its phrase; then we get additional  $\underline{x}$ s as we go up through NP, VP and NP, and finally (26d) adds one more, giving a total of 6. Again, contraction is acceptable here, so that tells us that  $\underline{J}$  in (21) is at least 6.

Contraction is not possible in (25b), due to the effects of the pitch-accent on the disjunctive. Selkirk only discusses the effects of accenting on prominence, as an increase in the number of vertical  $\underline{x}$ s a syllable is aligned with -- the accented syllable must gain enough  $\underline{x}$ s to come out most prominent in its domain, so there is no absolute increase in  $\underline{x}$ s that a pitch-accent requires. This renders the quantitative approach I am attempting to elaborate here somewhat tenuous at this stage, but for now I will continue on the assumption that a pitch-accent doubles the number of  $\underline{x}$ s associated with a particular syllable<sup>3</sup>. The effect is to be expressed as a proportional increase, rather than as an absolute one -- say, add 5 -- due to the effects of accenting on non-lexical items (function words), which I will discuss here briefly.

By the rules in (26), and Selkirk's Principle of Categorical Invisibility (PCI), which exempts function words from some or all of (26), some function words -- and we are concerned with pronouns here -- will remain juncturally adjacent to following words, and this adjacency is preserved under accenting. I am assuming here that accenting requires a concomitant increase in  $\underline{x}$ s in both the vertical and horizontal directions, so that accenting increases both relative prominence and disjuncture. It will be seen in the next section that the auxiliaries other than is/has require absolute junctural adjacency in order to contract, so their hosts can only be monosyllabic personal pronouns, which by the PCI are exempt from (26); the 'non-lexical' status of such pronouns is discussed in detail in Selkirk (1972). Now the possibility of contraction is preserved when the pronoun is accented:

- (29) a. He'll do what I tell him. [hi:l...]  
 b. HE'll do what I tell him. [ " ]
- (30) a. You think you're sad. [jɔ:(r)..]  
 b. You think YOU're sad, well I'm sad too. [ " ]

These examples are then different from (25). If the accenting required an absolute increase of, say, 3 in each direction, we would have the following representation for he in (29a/b):

- (31)            2                                    5  
 a. he 0      ==>    b. he 3

This representation predicts (29b) bad, on the assumption, to be justified below, that will requires absolute adjacency to contract. Now if, on the other hand, the scenting causes a proportional increase in the number of xs -- say, doubling -- the representations would be:

- (32)            2                                    4  
 a. he 0      ==>    b. he 0

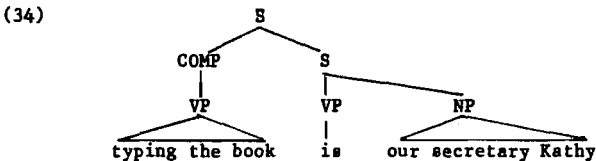
This predicts (29b) acceptable, as it is, and I therefore conclude that the alignment in the Syntactic-Prosodic Correspondences of a syllable with a pitch-accent is realized as a proportional increase in the number of associated xs as a metrical grid is constructed.

My assumption about pronouns is that they are not interpreted as phrases by (26); by the PCI, pronouns do not get a following beat by (26a), and if they are not to count as phrases they will not get one by (26c), either. (26b) will also not apply to pronouns, for they cannot be heads if they are not in phrases. I will not attempt justification of this position here, except to note that, as observed in Selkirk, Ch.7, excursus 1, something special has to be said about the phonological behavior of pronouns in English, and they systematically fail to behave as if they were treated as phrases phonologically<sup>4</sup>.

To return now to (25b), with a pitch-accent on book, the effect of the accent is to increase the disjuncture to an extent that contraction is no longer possible. The value for the disjuncture for (25a) was 6; minimally, accenting will cause this to increase to 8. This will happen if the pitch-accent is assigned to the word "book"; this word, the reader will recall, gets 2 beats by (26), qua word/head. If the accent is assigned here, the overall number of beats will be 8; if the accent is assigned to the NP the book, the number of beats to be doubled will be 3, giving a total of 9, and so on<sup>5</sup>. Presumably the focused constituent in (25b) is the NP the book, and I will assume then that J here is 9, too many for the operation of (21).

For the example (25c), it has been argued (Emonds (1976)) that the VP typing the book is in COMP, triggering subject-auxiliary inversion, perhaps. As the subject itself has been postposed, it is not clear if this inversion has taken place or not; the examples in (33) show that the subject has indeed been postposed. In (34) I give the presumed syntactic structure of (25c):

- (33) a. Commenting on Selkirk's paper has been Professor Plum.  
 b. \*Commenting on Selkirk's paper has Professor Plum been.



The sentence appears to have no particular intonation contour associated with it, but the appearance of the COMP node has a large effect on the phonology. I will discuss the phonology associated with COMP in detail in section 4; here I will simply note that on the natural reading of (25c), there is a comparatively massive pause following book, and such an observation is supported by the experimental findings reported in Gee & Grosjean (1981). For now, I will take the effect of the COMP node to be a doubling of the disjuncture associated with the material in COMP, although this may be somewhat conservative. After the VP cycle the representation will be book 4; after the cycle on COMP, the value of the disjuncture will therefore be 8. Unlike the pitch-accenting case, there will be no corresponding increase in relative prominence. I will also assume that (26d) adds a beat between COMP and is, giving the final value of the disjuncture following book in (25c) as 9. Again, contraction is blocked.

On the consideration of these three examples, then, we have seen that  $\underline{J}$  in (21), must be at least 6 and must be less than 9; I will return in section 4 to further consideration of the value to set for  $\underline{J}$  in (21), though 6 seems to be about the upper limit. In the rest of this section, I will discuss further the motivation for characterization of contraction in this way, and of determining and representing juncture as suggested above.

More examples of the type (25a/c) are given below, in (35) and (36); the (a) examples have the gerund subject, with a disjuncture of 6 between the last word and the auxiliary; the (b) examples have the preposed VP, and the disjuncture is 9:

- (35) a. Speaking for Jakobson's a great honor.  
 b. \*Speaking for Jakobson's Professor Chomsky.
- (36) a. Signing a lease for a house right now's no simple matter.  
 b. \*Signing a lease for a house right now's our first client.

My feeling is that (36a) is not quite as good as (35a), due possibly to the junctural characteristics of the adverbial right now, which seems to get some kind of accent on it; however, if we construct a similar example with a clear accent slightly earlier, contraction is fine, as in (37) below.

- (37) Signing a lease for a HOUSE at the moment's easy; getting an apartment is much harder.

Now if these assignments of junctural distance are to have any value, it is important to show that other rules are sensitive to the distinctions drawn; one other such rule is the rule of English that deletes /t/ interconsonantly, as in postman, Christmas, West Coast, etc. For my purposes here I give the rule as (38), though a more general formulation is possible, and is given in Selkirk (1972):

- (38)  $t$ -deletion  $t \rightarrow \emptyset / s \_ \_ \_ C$ <sup>K</sup>  
 where  $\underline{K}$  is the maximal disjuncture over which the rule operates.

For example, the rule fails to apply across clear boundaries:

Sells: Juncture and the Phonology of Auxiliary Reduction in English

- (39) a. Fetching the post, Kathy fell.                           \*[poskæθ...]  
 b. There must, can't you see, be a general condition on rules.                           \*[mʌskən...]

However, the rule can apply across NP VP, although speech-rate may have to be increased a little for some speakers:

- (40) a. The contrast confused me.   [trɔskðn...]  
 b. The nimble priest climbed in through the window.   [prisklæmjn...]

If we look at the operation of the rule in the environments (25a/c) considered above, we find that in the cases with the gerund subject, t-deletion is fairly acceptable, in contrast to the cases of VP-preposing, where it is completely out:

- (41)         (We are allocating jobs.)  
 a. Fetching the post could be my job.   [poskðd...]  
           (The new employee is not in sight; and it is known that  
           someone is fetching the post. So I give a list:)  
 b. Fetching the post could be the new employee.   \*[poskðd..]

My feeling about these examples is that if one says the (b) example with the unavailable pronunciation as indicated, one gets the (rather peculiar) (a)-type reading. Another pair:

- (42)         (I won third-prize in a fancy-dress competition.)  
 a. Dressing as a priest came in third.   [priskem...]  
           (I'm listing who came:)  
 b. Dressed as a priest came Bill.   \*[priskem...]

Recall that the disjuncture in the (a) cases is 6, 9 in the (b) cases; the value for k in (38) seems around 6.

In slightly faster speech, again, regressive nasal assimilation can apply between phrases, such as across NP VP in (43):

- (43) a. The man confused me.   [mæŋkjðn...]  
 b. Those women can talk!   [mðŋkjðn...]

This rule is juncturally sensitive too; it is acceptable in the (a) cases below, but again completely out in the (b) cases:

- (44) a. Carrying a fan came in third.   [fæŋkjem...]  
 b. Carrying a fan came Bill.   \*[fæŋkjem...]  
 (45) a. Worshipping the sun came naturally to the Druids.   [sʌŋkjem...]  
 b. Worshipping the sun came the Egyptians.   \*[sʌŋkjem...]

The junctural distinctions predicted by the account given above seem well evidenced in these examples; and the increasing acceptability with faster speech is suggestive too of a junctural explanation, for the reasons discussed above: it is not simply a case of a rule once-and-for-all operative or else blocked.

In conclusion, then, the proposal is to adopt the formulation of contraction in (21), where the value for  $\underline{J}$  is set at 6. As formulated, (21) applies to all auxiliaries which have an unstressed vowel, and no onset; it is not restricted to is/has, but applies to the reduced forms of all the auxiliaries listed in (5). The distinction between is/has and the rest derives from facts of English syllabification, which I discuss in the next section of the paper.

### 3. SYLLABIFICATION

It is presumably not accidental that the auxiliaries that contract freely have the same contracted form (/z/) as the plural /z/ and genitive /z/, although it is not so easy to state the apparent generalization formally. There has been much debate in the literature as to the underlying form of the inflectional endings in English; for the cases in point, the main debate concerns the (non)syllabicity of the underlying form; for instance, is the genitive marker /əz/ or /z/? A discussion of this and related issues is presented in Zwicky (1975); we might note here that if the underlying form of the plural and genitive were /əz/, we could have a rule of schwa-deletion sensitive to the phonological identity of the host (i.e. /z/), a rule which would apply automatically to is and has once the vowel had reduced. Of course, such a solution is not without its own internal problems, but it would lend a ready solution to the problem here, in that it would contract is and has without affecting the other auxiliaries. For these, there would have to be a separate rule deleting the schwa when the auxiliary was preceded by a monosyllabic personal pronoun.

Rather than pursue this particular solution here, I will formulate a different one, one which allows rule (21) to apply to all auxiliaries. I will take the underlying form of the inflectional endings to be /z/, with a rule of epenthesis for forms like buses. Following a suggestion by Lisa Selkirk, the phonological form of the plural and genitive markers will be as shown in (46):



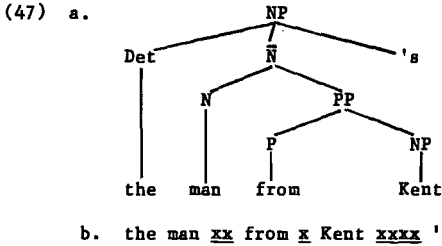
The form /z/ is specified as a rime, to ensure that if epenthesis occurs, the epenthetic vowel will precede the /z/. The contraction rule (21) is allowed to operate on all auxiliaries, for the rules of syllabification will make the necessary distinction between /z/ and the other contracted forms of the auxiliaries.

As observed in Selkirk, Ch. 1, there is in general no resyllabification out of words in English phrase phonology, except in particularly fast speech. As syntactic structures are interpreted phonologically, syllabification is assumed to be automatic at the beginning of each cycle; as it is seemingly constrained to word-internal operation, the general syllabification rules must clearly respect silent demibeats that may be in the representation. The fact

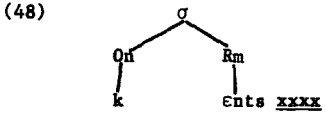
Sells: Juncture and the Phonology of Auxiliary Reduction in English

that the auxiliaries except is/has only contract onto pronouns, with which they will have junctural adjacency, follows from this view of syllabification -- only in such circumstances will the floating rime left by (21) be able to syllabify into the preceding material. I will assume that floating rimes that cannot be so syllabified are 'saved' by an epenthesis rule that undoes the effects of (21).

In contrast, /z/ is subject to different conditions of syllabification; if we have a syntactic structure as shown in (47a), with the genitive marker 's, the representation of disjuncture will be as in (47b) as the NP-cycle is entered:



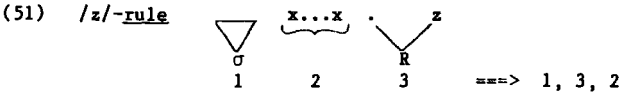
The actual phonological form of 's will be as in (46). Now the 's can syllabify here, but clearly the four xs, which are part of the phonological representation, do not become syllable-internal as part of this process. That is, the outcome of syllabification of 's must be as shown in (48):



Clearly the reason why we find is and has contracting freely in English is due to the fact that such 'long-distance' syllabification of /z/ is allowed. It seems that /z/-syllabification is completely insensitive to juncture; the examples in (49) are fine with quite complex NPs, and even (50) seems just about acceptable, across an intonational phrase boundary:

- (49) a. The man I met's father.
- b. The woman that you said you thought had fainted's handbag.
- (50) ?That man, who I know you like's, hat, is French.

Therefore I propose that English has the adjustment rule (51), which does not syllabify /z/, but puts it in a position where it can then syllabify by the general rules of the language:





(51) allows for any /z/ left floating to syllabify; so the fact that only is/has contract freely is attributable to (51). However, the actual distribution of the contracted forms of is/has is determined by (21), which is of course juncturally constrained.

As noted in footnote 2, I assume that the progressive voicing assimilation that we observe is an automatic consequence of the syllabification procedure; some sample derivations are given below:

(52) Input	<u>Pete has</u>	<u>Chris is</u>	<u>Sue had</u>
	3 2	3 2	3 2
Grid Construction	pit 4 hæz	kris 4 iz	su: 4 hæd
	3 1	3 1	3 1
Destressing	pit 4 hæz	kris 4 iz	su: 4 hæd
	3 1	3 1	3 1
Glide Deletion/ Vowel Reduction	pit 4 əz	kris 4 əz	su: 4 əd
	pit 4 z	kris 4 z	su: 4 d
Contraction (21)	pit 4 z	kris 4 z	su: 4 d
/z/-rule (51)	pitʒ 4	krisz 4	-- -- --
Syllabification <sup>7</sup>	pits 4	-- -- --	-- -- --
Epenthesis	-- -- --	krisəz 4	su: 4 əd
Output	[pits]	[krisəz]	[su:əd]

#### 4. MORE ON DISJUNCTURE

In this section I will discuss further the junctural characteristics of COMP, and also the effects of pitch-accenting on disjuncture. The suggestion in section 2 was that during the cycle on the COMP node, the number of following xs is doubled, and I will adopt this for the purposes of the current discussion.

It has been noted -- e.g. Selkirk (1972), Kaisse -- that contraction is possible with a monosyllable in COMP, but that it is much less natural with a phrase, or even a polysyllabic word:

- (53) a. Where's the fire?  
b. \*In which room's the fire?
- (54) a. How's he going to do it?  
b. \*However's he going to do it?

Given that where and how are pronouns, as argued in Selkirk (1972), they will have no following sdb's by (26), and so the auxiliaries in (53) and (54) will be juncturally adjacent<sup>8</sup> in the (a) cases; but in the (b) cases, (26) will add some following sdb's, and the number of these will be doubled, blocking the operation of the contraction rule (21) as the value for J is exceeded. (In

Sells: Juncture and the Phonology of Auxiliary Reduction in English

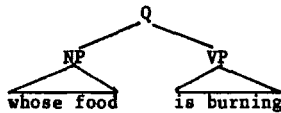
(54b), there is usually a pitch-accent on however which adds to the disjuncture.)

Now it has also been observed that contraction with movement from a (matrix) subject position is usually much better than corresponding object extractions; for me, the following (b) examples are pretty bad, but many speakers find them relatively acceptable (although worse compared to the (a) examples):

- (55) a. Whose food's burning (subject)  
 b. ?Whose food's the goat eating? (object)
- (56) a. Which man's leaving first? (subject)  
 b. Which man's she the fondest of? (non-subject)

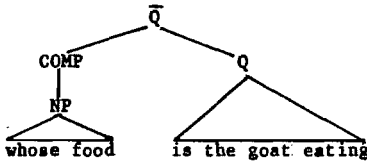
I think there is no doubt that the (a) examples are perfectly acceptable, which suggests that the difference between these and the relatively much worse (b) examples must be due to differences in syntactic structure, although intonation has an effect here too, as I will discuss below. If one adopts the analysis of subject 'extractions' of Gazdar (1981), the facts in (55) and (56) follow. Gazdar proposes that there is no displacement at all with subjects, and that the wh-phrase simply sits in the subject position, as shown in (57):

(57)



If this is the correct structure, then the number of sdb's following food is 4, as in the usual NP-VP case, and (21) will apply freely. Now if the same phrase is in COMP, doubling the internal disjuncture (to 6), then the disjuncture with an object-extraction is at least 6, possibly 7 is (26d) treats COMP as a daughter of S and adds a beat between it and the auxiliary which has undergone subject-auxiliary inversion. The structure of (55b) is shown in (58):

(58)



With the disjuncture after food being 6-7, (21) will be just about applicable, for some speakers at least, although intonation may affect (increase) the disjuncture too. However, the present account does not rule (55b) as bad as say (25b) above, where the disjuncture was determined to be 9. We can in fact find many examples of non-subject extractions where contraction seems to be acceptable:

- (59) a. Well, how often's this gonna happen?  
 b. What time's the party?  
 c. Which contestant's Pete got his eye on?

Note that, for these to be acceptable, any pitch-accent must fall on the initial word (i.e. not the host), that is on how, what, or which. In the pair in (60), the accent falls on the potential host in the second example, and contraction is very unnatural here:

- (60) a. WHICH coat's the warmest?  
 b. ?Which COAT's Amelia buying?

The accent appears to fall on which in (60a), which is a subject extraction, and on coat in (b), which is an object extraction. So the prosodic structure merely accentuates the differences in disjuncture due to the syntactic structure.

Now by altering the accents sufficiently, we can almost turn around the judgments in (60); heavy accent on coat in the (a) case renders contraction impossible; in the (b) case the syntactic disjuncture means that contraction is only marginally applicable anyway, but accepting which appears to make contraction somewhat more acceptable, although still awkward perhaps:

- (61) a. I didn't say "Which GOAT is the warmest?", I said  
 "Which COAT is the warmest?". (contraction impossible)  
 b. Bill was astounded. "WHICH coat's she buying", he  
 asked us. (contraction OK?)

In the (a) example, coat or coat gets 3 sdb's by being inside NP; as noted in footnote 3, probably the correct way to think of the effect of accenting on disjuncture is of a proportional increase — say, a perceptible pitch-accent doubles the associated xs, and a contrastive accent triples them, or some such proportional increase. If the juncture in (61a) is doubled (to 6), then with (26d) the disjuncture will be 7 — we can take this as a minimum figure, as the accent is clearly fairly strong, and contraction will be difficult at best. In (61b) the disjuncture is maximally 7, for the accent falls not on coat but which. In the 'normal' case (60(b)), if even a slight accent falls on coat as suggested, then the disjuncture will be greater than 7, that is, greater than the disjuncture in (61b); so (61b) should be better, if not totally acceptable.

We can observe similar accentual effects in an example like (59a) repeated here in alternate ways in (62):

- (62) a. Well, HOW often's this gonna happen?  
 b. \*Well, how OFTEN's this gonna happen?

Even though how often is in COMP, syntactically it is sufficiently simple to allow contraction over its double disjuncture, unless accenting increases this further. Notice that the mechanism for syllabifying increases this further. Notice that the mechanism for syllabifying /z/ discussed in the preceding section is not, as suggested there, sensitive to the changes in juncture under consideration here; the genitive 's, for example, readily attaches to its host in examples such as:

- (63) a. That WOMAN's gall!  
 b. I said I like the COFFEE's taste, not the TOFFEE's taste.

## Sells: Juncture and the Phonology of Auxiliary Reduction in English

So it must be that the rule of contraction itself is sensitive to these differences in disjuncture, as has been the position throughout the paper.

As noted in section 2, other phonological rules are similarly sensitive. For example, regressive nasal assimilation is at least possible in the (a) case here, but not at all possible in the (b) case (cf. (62)):

- (64) a. Well, **HOW** often can I see you? [afəŋkən...]  
b. Well, how **OFTEN** can I see you? [afənknən...]  
\*[afəŋkən...]

The rule of t-deletion supports the distinction also, as seen in the following pair:

- (65) a. **WHICH** coast can be reached most easily? [koskən]  
b. Which **COAST** can you see most easily? [kostkən]  
\*[koskən]

The prosody of the sentence can affect even the most basic cases of contraction, such as sentences with NP subjects. For instance, there are various ways of pronouncing (66) that affect the naturalness of contraction:

- (66) No one smoking a pipe's allowed in this room.

With accent on pipe, that is, with a contour like: no one smoking a pipe, contraction is rather difficult, but if no one is accented:

no one smoking a pipe, then contraction is acceptable. Similarly, contraction is not very good in the examples in (67), although if the accent is slight enough, perhaps it is not too bad; this is a consequence of the possibility of different 'degrees' of accenting, as note above:

- (67) a. The man that you **MET** is the one I like.  
b. Nothing you **DID** is the problem, it's what you **SAID** that is.

To conclude this section, I will consider further the effects of COMP on the disjuncture.

My suggestion has been that the COMP cycle doubles the number of following demibats that the material in COMP has received on earlier cycles (if any). This may actually be rather conservative -- the pausing data in Gee & Grosjean (1981) shows comparatively huge pauses after COMP, and the representation in terms of xs is supposed to bear at least some relation to pausing/lengthening phenomena. The actual mechanism Gee & Grosjean propose for computing juncture is so different from the sdb-addition adopted here that any strict comparison would not be feasible. Their rules for COMP effectively make the juncture following COMP slightly larger than the sum of (a) the largest juncture in the COMP-internal phrase and (b) the largest juncture in the complement S (these are internal junctures -- final sdb's are not important in their system).

Consequently, the COMP-S juncture is computed not only with regard to the syntactic complexity of COMP (as it is here), but also with regard to the complexity of the complement S (unlike the proposal here). The doubling requirement here equates the complexity of S with the complexity of COMP -- it says that the value for (a) above plus the value for (b) is equal to twice the value for (a); so the value of (a) is equal to that for (b). So the proposal here is conservative to the extent that the complexity of S is greater than the complexity of COMP -- assuming the validity of Gee & Grosjean's algorithm -- which in most cases it clearly is.

However the post-COMP juncture is to be determined, it is clear that it becomes larger very quickly as the syntactic complexity of the material in COMP is increased. consider for example the cases of 'Comparative Preposing' from Kaisse:

- (68) a. More important is her insistence on beauty.  
b. \*More important's her insistence on beauty.
- (69) a. Equally difficult is the solution of Fermat's last theorem.  
b. \*Equally difficult's the solution of Fermat's last theorem.

The judgments are Kaisse's; for me (69b) is on the borderline -- by the rules as given, the disjuncture would be at least  $2 \times 3 = 6$ , and possibly 7 if an extra beat is added by the 'S-daughter' provision (26d). Ensuring that any accent falls on equally renders contraction just about possible:

- (70) I'd say that the question about the Bernoulli effect is just about the hardest, but EQUALLY difficult's the solution of Fermat's last theorem.

If a level of embedding is added to the phrase in COMP, increasing the disjuncture in (69b) by 2, contraction becomes much worse:

- (71) ?I'd say that the question about the Bernoulli effect is just about the hardest, but EQUALLY difficult without help's the solution of Fermat's last theorem.

Now if the Gee & Grosjean algorithm for predicting pausing/lengthening is the correct algorithm here, then increasing the complexity of the complement S ought to make contractions worse too; in (72) some phonological phrases have been added to (69b), increasing the internal complexity, and hence by their algorithm the disjuncture following COMP, but it does not seem that the naturalness of contraction is affected:

- (72) I'd say that the question about the Bernoulli effect is just about the hardest, but EQUALLY difficult's the solution from first principles without using integration of Fermat's last theorem.

This does not necessarily mean that the proposals here are incompatible with those of Gee & Grosjean -- their's is a model of performance, but the rules here are rules of (phonological) competence, and as such may be subject to different principles that govern their application.<sup>9</sup> What seems clear is that the post-COMP disjuncture is always relatively large, from which the subject/object asymmetries noted at the beginning of this section follow if the syntactic analysis as proposed by Gazdar (1981) is adopted.

5. DISTRIBUTED NOMINALIZATIONS

As a final example of a construction where the account of the contraction facts must take prosodic structure into consideration, I will discuss the so-called 'distributed nominalizations', as in (73):

- (73) a. The decision is to go ahead with it.  
 b. The prospect is for early success.  
 c. Mary's picture is of John and Shirley in Mahopac.  
 d. The plan is to eat as soon as we get there.

Contraction seems well-nigh impossible in these cases. Kaisse proposes that the structures in (73) are derived by movement, with the complement, such as for early success (73(b)), moving out of the subject NP into an empty predicate position, thus:

- (74) a. [<sub>NP</sub> the prospect [<sub>pp</sub> for early success]] is [<sub>pp</sub> e]  
 b. [<sub>NP</sub> the prospect [...[<sub>pp</sub> e<sub>i</sub>]]] is [<sub>pp</sub> for early success]<sub>i</sub>

With such a syntactic derivation, Kaisse is able to block contraction with her version of the requirement on the following context, to be discussed in more detail in the following section; roughly, contraction is only possible if what follows the auxiliary remains the same through the derivation -- (74) clearly violates this. However, the account in (74) is not (syntactically) well-motivated, as argued in Higgins (1973). There are two types of counterexamples to the movement analysis; first, some noun complements cannot appear in structures like (74b), even though they can appear in the putative source constructions like (74a):

- (75) a. John's anger that he was not chosen (was vented on all of us).  
 b. \*John's anger was that he was not chosen.  
 (76) a. Our inability to contain ourselves (proved an embarrassment).  
 b. \*Our inability is to contain ourselves.

Secondly, we find counterexamples of the other type, where the (b)-type collocation is good, but there is no good (a)-type source:

- (77) a. \*John's dream to better himself (was shattered).  
 b. John's dream is to better himself.  
 (78) a. \*His affection to pretend that he is not affected (is a put-on).  
 b. His affection is to pretend that he is not affected.

Therefore a movement analysis leads to serious syntactic misgeneration, and Higgins argues for base-generation of all such examples, subject to some kind of semantic filtering (to put it broadly). However, if the movement analysis cannot be maintained, neither can Kaisse's explanation for the lack of contraction.

Kaisse notes that when the auxiliary in question is followed by something else, such as another auxiliary as in (79), contraction is acceptable:

- (79) a. The decision's been to go ahead with it.  
 b. The prospect's been for early success.  
 c. The picture's been of John and Mary, but it seems to be transforming into one of a barn.  
 d. The plan's been to eat as soon as we get there.

These are predicted by Kaisse as what follows the auxiliary, been, follows it throughout the derivation.

Looking at the matter from a phonological viewpoint, what distinguishes the examples in (79) from those in (73) is that the auxiliary cannot destress in (73), where it can in (79). Selkirk proposes that in examples such as (73), is carries a pitch-accent, which prevents destressing. If this is so - and the form [z] sounds fairly unnatural in these examples -- then the addition of more material as in (79) allows the pitch-accent to appear elsewhere, allowing the auxiliary to destress. The accent clearly falls on the following word in these examples:

- (80) a. The prospect's NOT for early success.  
 b. Mary's picture's NOT of John (at all).  
 c. The decision's NEVER to implement the proposal.  
 d. The plan's UNFORTUNATELY to eat as soon as we get there.

The example (80c) appears to be another counterexample to Kaisse's movement proposal, for on the basis of the tests in (81) and (82), never to implement the proposal is a constituent, which would require a base-structure as in (83), which should not allow contraction on Kaisse's account, for what follows is not the same throughout.

- (81) a. The decision is, he said, never to implement the proposal.  
 b. ?The decision has, he said, been to go ahead with it.  
 (cf) c. \*The decision has, he said, been to go ahead with it.  
 d. The decision has been, he said, to go ahead with it.
- (82) a. The decision is the following: never to implement the proposal.  
 b. \*The decision is never the following: to implement the proposal.  
 (cf) c. \*The decision has the following: been to go ahead with it.  
 d. The decision has been the following: to go ahead with it.
- (83) [<sub>NP</sub> the decision [<sub>VP</sub> never to go ahead with it]] is [<sub>VP</sub>]

It appears that these structures have a characteristic intonation contour which has a rise at a certain point in the phrase; in the examples (80), the rise is manifest as marked; in (79), been carries it: the rise appears to mark the beginning of the content of the subject complement. So (79a), for example, finds a suitable context where the "been"-ness is the topic:

- (84) The decision's BEEN to go ahead with it, up to now, but things may change.

In the examples in (72), as suggested by Selkirk, the accent falls on is, giving the complement focus:

- (85) The prospect IS for early success, contrary to what you may have heard on the radio.

## Sells: Juncture and the Phonology of Auxiliary Reduction in English

This intonational rise can sometimes be found on the subject nominal itself, creating a large disjuncture between it and the auxiliary, blocking contraction; (72d) is, for example, perhaps most naturally read this way:

(86) The PLAN is to eat as soon as we get there.

If the accent can be 'guided' away from this location, contraction becomes almost acceptable in even these cases:

(87) ?The plan's to EAT FIRST, and THEN go to the beach.

Of course, if the accent remains on the subject nominal, then contraction is not possible even with material following the auxiliary; (87) and (88) show that one must consider these intonational effects in the account of contraction:

(88) a. The PLAN has always been to eat first. (has = [əz])  
b. \*The PLAN's always been to eat first.

I take up the contrast between the current approach and that of Kaisse, and of others, in the next section.

### 6. OTHER ACCOUNTS

In this section I will focus primarily on Kaisse's proposals for the account of contraction, although other proposals by Wood, Zagana, and Selkirk will be considered too. Kaisse argues that contraction is best treated synchronically as allomorphy, with the form 'a listed in the lexicon.<sup>10</sup> There is not contraction rule per se, "rather a rule, or series of rules stating under what circumstances the reduced allomorph may be inserted". The process is two-stages: first, "a restructuring rule Chomsky - adjoins the AUX onto the preceding word; then a morphological spelling rule optionally realizes it as the reduced [=contracted/PS] allomorph".

Kaisse's overall aim is to provide an account of contraction that does not mix syntactic and phonological information, and with this I am in complete agreement. Kaisse's more specific position is roughly that if we were to treat contraction phonologically, we would have to refer to syntactic information in the phonological rules that were contracting the full forms of the auxiliaries, and anyway those rules would be special to just these forms. While these observations are of course valid, one cannot use them a priori to argue against a phonological approach; rather, it must be shown that the rules in question, no matter how restricted, fail to show properties characteristic of phonological rules -- for example, are not sensitive to other phonological information. My purpose in this paper has been to show that even though the phonological rules that describe contraction are peculiar to a small class of words in the language, those rules are indeed sensitive to other phonological information that is by the nature of the organization of grammar unavailable in the syntax (ie information about intonational structure), rendering a syntactic account either empirically inadequate or so encumbered with extra provisos that both elegance and explanatory power are utterly obscured. I will elaborate this last charge below.



Kaisse's rule makes reference to both preceding and following context. It is as given in (89):

(89) NP AUX X ==> 1#2,  $\emptyset$ , 3  
 1 2 3

where 1 c-commands 2 and 3 followed 2 at NP-structure. In addition, if 1 is a (monosyllabic) non-lexical item, it need not be an NP and X must merely mark a movement or deletion site.

The rather inelegant extra proviso here accounts for the facts of hosts in COMP, which were discussed above -- the fact that any monosyllable in COMP can be host for any auxiliary that reduces follows without stipulation on the account given above, for in these cases there will be zero disjuncture, and so any rime can in principle be resyllabified by the rules discussed in section 3. I will not enter into detailed discussion of the general condition on the following context, that "3 followed 2 at NP-structure", for its formulation in this particular way is not necessary (as argued in Zagona (1982)), and it will serve my purposes here simply to outline the effects of the condition.

Primarily, this condition blocks contraction in environments where the auxiliary would not destress anyway, and hence merely recapitulates independently-needed conditions on destressing; for in Kaisse's account the full forms can destress (e.g. /hæz/ ==> [əz]), but the contracted form (/z/) is separate -- otherwise there is no way that Kaisse allows for (what I call) the reduced forms.

Now as noted by Selkirk, such an account cannot capture the generalization that contraction only occurs in a subset of destressing environments, which seems to be an important loss. It turns out that all the other cases, where destressing can apply but contraction is not possible, that Kaisse's following context condition would rule out, are independently ruled out by the requirement on preceding context. For instance, an example like (90) which Kaisse rules out by the following context requirement that she has, is out by the preceding context requirement anyway, as item 1 is not an NP:

(90) Not even in New York [əz]/\*[s] Jack considered easy-going.

Typical cases where destressing is blocked independently are, as mentioned above, when the auxiliary is phrase-final, as in (91) below. A statement, and discussion, of these conditions on destressing is given in Selkirk (1972), and (to appear).

(91) a. I don't know where Fred is. \*[fredz]  
 b. Do you know who's playing?  
 -- No, I can't imagine who is. \*[hu:z]

Selkirk (to appear) discusses the similar phonological effects that any kind of syntactic empty element shows, be it a movement-site, deletion-site, or base-generated empty position (e.g. I don't know where Fred is  $\emptyset$  tonight); in all such cases, Kaisse's condition on the following context merely reiterates restrictions independently necessary in the grammar.

Kaisse's preceding context condition -- that the host be an NP -- provides for a more interesting comparison with the account presented in the present paper. Several problems are attendant upon such a formulation of the restriction on what the host can be; there are factual predictions that are incorrect, as I

will describe below. Also, if it were the correct generalization that the host be NP, this would sit rather oddly with the observations made above that in those environments where contraction is blocked, so are t-deletion and nasal assimilation -- these last rules are surely not subject to syntactic conditioning. It would further seem that a restriction stated this way should rule the examples either once-and-for-all good or bad, which does not seem to be the way the judgments go. Finally, that the host be pbrassal at all seems incorrect; in the account here, the host is the preceding word, and even on Kaisse's account, the rule as stated above adjoins the AUX onto "the preceding word". So on Kaisse's account, the 'host' for the purposes of the environment of the application of the rule is not the 'host' for the purposes of the operation of the rule, which seems rather inconsistent at best.

However, the strongest arguments against a syntactic account of contraction comes directly from the facts; the rule (89) both overgenerates and undergenerates, in that not all NPs that meet its requirements can be hosts, and that some non-NPs can be hosts. For instance, the (a) examples below meet the requirements of (89), yet contraction is totally impossible.

- (92) a. Which book did you tell Pete \_\_\_ is still in the library?  
 b. \*Which book did you tell Pete's still in the library?
- (93) a. Which is the book I should remind Rick \_\_\_ is due back the 15th?  
 b. \*Which is the book I should remind Rick's due back the 15th?

This cannot be attributed to some kind of 'clause-mate' condition to the effect that the auxiliary cannot contract out of its S, for this is precisely what it has done in example (94), which is a spontaneous utterance of mine.<sup>11</sup>

- (94) You should do whatever you think's best.

Other examples, like (92) and (93) where NPs fail to be hosts, were given in (67) and (88a) above.

On the other side of the coin, there are examples like (94) where a non-NP is a host; I give more examples in (95):

- (95) How often's this gonna happen?  
 What does it say's the best thing to do with this piece?  
 The man that I heard's been hiding here is German.  
 That you got here at all's a miracle.  
 How late for work's Tricia been this week?  
 How late's late?  
 How certain's Bill of getting elected?  
 What do you reckon's the matter with it?  
 But hardest to take's Pete's insistence on bringing the dog.

Such examples must presumably be attributed by Kaisse to some other mechanisms in the grammar. However, if one were to try to build in extra provisos, one would have to add the condition even for NP-hosts that the last item in the phrase not receive a pitch-accent in the Syntactic-Prosodic Correspondences, a rather odd restriction to place in the syntax. This could be done if the syntactic structure is annotated with Fs to mark focus as in Jackendoff (1972), for these correspond to the assignment of pitch-accents. That is, one could require that hosts for contracted auxiliaries could not be assigned an

E, but this would suggest that any explanation that this offered for contraction must be related to the interpretation of Es -- in other words, that the restriction on contraction is somehow semantic. In contrast, if one can refer directly to pitch-accents in a phonological account, then it makes perfect sense to say that the explanation for the restrictions on contraction is related to the interpretation of pitch-accents -- that interpretation being as xs, which it is claimed are exactly the elements of the theory that contraction is constrained by.

The proposals of Wood (1979) and Zagana (1982) address only the conditions on the following context, and so I will not discuss them in any detail. Wood places a requirement on the syntax that a VP not be empty, where contracting an auxiliary is (correctly) seen as moving an auxiliary out of VP; if this is the sole item in VP, her constraint is violated, accounting for the failure of contraction in examples like (91) above.

Zagana's account is much like Wood's, but relies on the Empty Category Principle (ECP) of Chomsky (1981) to do the same work as Wood's constraint. Zagana allows full forms of auxiliaries to be proper governors for empty categories, while the contracted forms, being 'clitics' in her sense, are not proper governors. Simplifying somewhat, in an example like (96), the contracted form is not possible as it does not properly govern the empty category left by wh-movement, and as there is not other possible governor, the ECP is violated:

(96) \*I wonder where Bill's [ e ]

However, this leads to problems with matrix questions, where again ECP ought to prevent the possibility of contraction:

(97) Where's Bill [ e ] tonight?

Zagana has to allow the clitic 's to be an optional proper governor of [e] in just these cases, which seems to have no independent justification. Zagana's account is basically an extension of Kaisse's, and is therefore subject to the same criticisms, as given above. Moreover, this extension of ECP to cover what would otherwise fall to conditions on destressing is not motivated for other cases of lack of destressing, such as the case of the distributed nominalizations discussed in section 5, once the movement analysis of these constructions has shown to be implausible.

Finally, a slight inconsistency common to both Kaisse's and Zagana's proposals is that a rule of glide deletion like (13) above is apparently required, even though Kaisse suggests that this is a rule the syntactic account need not postulate. This is because, in order to generate an example like (98), the form [əz] must come from the full form:

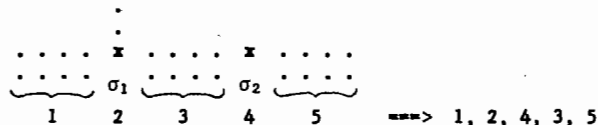
(98) The man [əz] finally gone.

If this does not come from underlying /hæz/, then the form /əz/ must itself be listed reduced allomorph; yet if this is so, then a separate rule of contraction is needed independently, to get the non-syllable form. Presumably this is not what Kaisse intends; therefore in the final analysis, the only

formal differences between the two approaches devolve on the statement of the contraction 'rule' as (89), or as (21) above. I have argued in this section that the latter is descriptively and conceptually preferable.

The proposal by Selkirk (to appear, Ch.7) is similar to that presented here in that the rule of contraction is part of the 'phonology', and creates junctural adjacency between auxiliary and host; Selkirk's rule is:

(99) Rhythmic Aux Contraction



$\sigma_2$  = has, is, had, would

The rule takes auxiliaries as specified and moves them across the intervening juncture (factor 3); once adjacency is achieved, the nucleus of the syllable is deleted. Selkirk allows the rule to apply to had and would, as for her full contraction is possible in examples such as:

- (100) a. The foci'd been altered.
- b. My mother'd do it better.

I have not treated had and would in this way for, as noted in (10) above, such contraction is not possible in my speech in the examples in (100).<sup>12</sup> The main difference between Selkirk's rule and (21) above is that her rule does not allow the fact that the regular contracting auxiliaries is and has reduce to a form identical to the inflectional endings /z/ to follow from other parts of the theory. On the account given here, this does follow, for the actual 'movement' across the juncture accomplished by Selkirk's (99) is accomplished by the /z/-rule (51), which is part of the battery of rules of syllabification.

Selkirk says of her rule (99) that it "has no further rhythmic conditions, but it is not to be excluded that there may be some condition on factor 3 in the rule, placing limits on the rhythmic distances allowable between the auxiliary and what precedes". This condition is argued to exist here, as the requirement that J in (21) be set at a maximum value, around 6, and could be added into Selkirk's rule as the requirement that factor 3 be no greater than 6 xs 'long'. In (99), then, the rule creating adjacency is the one that is juncturally sensitive; in the account I have presented, the rule deleting the nucleus is the one that is juncturally sensitive, and the rule (51) that creates adjacency is not at all sensitive to juncture.

The idea then of the current proposal is to restrict juncture-sensitivity to the set 'phonological' rules, such as the deletion rule (21); the fact that we do not get — in general — resyllabification out of words in English suggests that for English we should maintain that syllabification rules are juncture-insensitive.<sup>13</sup> For the particular form /z/, this is represented by letting (51) apply over any disjuncture. In effect, Selkirk's rule (99) obscures this

difference between the nature of phonological rules and the nature of syllabification rules (in English); to the extent that this is an important difference, it argues in favor of the account presented here.

In conclusion then, I have shown that any syntactic account of contraction cannot do justice to the facts in a uniform fashion, even allowed a certain theoretical distension -- the facts about non-NP hosts, in (95), are most problematic; clearly, just lifting the restriction that the host be an NP would open the flood-gate to a whole tide of counter-examples. Given the two phonological accounts with which I am familiar, Selkirk's and my own, the former fails to relate the fact that it is is and has that regularly contract to the phonological idiosyncrasies of /z/, and thus the latter may be considered superior in this regard.

#### FOOTNOTES

\* A shorter version of this paper, under the same title, was presented at the 1983 GLOW Colloquium in York. I am most grateful to Lyn Frazier, Alan Prince and especially Lisa Selkirk for help and advice with this paper.

<sup>1</sup>There is some equivocation in the literature as to whether the host is a phrase or a word; in an example like:

(i) The man you met's the one I like.  
the 'syntactic' host seems to be the whole subject NP, but clearly at a phonological level, the host is the verb met. On my view here, the host is always the preceding word.

<sup>2</sup>It is assumed that the voicing assimilation /z/ --> [s] is an automatic consequence of the resyllabification of the /z/ into the preceding rime.

<sup>3</sup>I will suggest in section 4 that the increase is actually proportional to the 'strength' of the accent -- the stronger the accent, the greater the proportional increases. At the present stage of research, this is just a way of representing levels of disjuncture that accenting clearly creates (see footnote 6 for these 'levels'); in the text, I take doubling to be a reasonable increase in disjuncture, but really all this means is 'more'.

<sup>4</sup> Notice that pronouns also do not count as daughter phrases for (26d), and therefore a subject pronoun is juncturally adjacent to a following VP.

<sup>5</sup> The discussion here is factually inaccurate, as pointed out to me by Alan Prince. With an accent just on the noun, I predict a smaller junctural increase than with the accent taking a wider scope, but narrow, contrastive accenting seems on the contrary to create more disjuncture than does a regular phrasal accent. I can only suggest that it happens to be the case that contrastive accenting is much heavier than phrasal accenting, and therefore with narrow focus on the noun, the disjuncture is not doubled, but rather increased by some much greater factor, resulting in the perceived greater disjuncture with narrow focus.

6 It seems unlikely that there are as many 'degrees of disjuncture' as the present account would seem to imply -- e.g. 0, 1, 2, 3, sdba, etc. -- but rather there are levels of disjuncture, such as:

- 0 = adjacent
- 1-2 = close
- 3-6 = mid
- 6+ = distant

This is again purely speculative on my part.

7 /z/ cannot be syllabified into a rime containing a segment that is [+cor, +strid], and therefore the case of Chris is must then undergo epenthesis; cf. buses, Buzz's, judge's, etc.

8 It may be that (26d) adds an x between a COMP and S, where the auxiliary is assumed to be inside S atill, even after subject-auxiliary inversion. Contraction appears to fail in an example like (ii):

- (i) How'm I supposed to know? [hawðm...], \*[hawm...]

which suggests that how and am are not strictly adjacent; the operation of (26d) would account for this.

9 For example, pausing to allow time for planning the next stretch of utterances may well occur between COMP and S, but is not to be phonologically represented.

10 Steele et al. (1981, 290ff) suggest that if a plausible analysis that lists 'g can be developed, the 's will merely represent third person singular present tense, with no aspectual value.

11 I am grateful to Nirit Kadmon for noticing me produce (94), and to Alan Prince for pointing out its relevance to the current discussion.

12 The process involved in (100) may not be what I am concerned with here, for those speakers who accept these examples -- it may be a process of vowel-schwa coalescence, applying in fast speech. The mother'd sequence in (100b) might be treated in this fashion if mother ends in an r-colored-schwa, rather than [r]. If this is a possible explanation, then no speakers should get:

- (iii) I looked for him, but Phil'd gone. [fɪld...]

with the pronunciation as indicated.

13 I assume that universally, syllabification operates word-internally, as a basic principle; this I consider juncture-insensitivity in that juncture is simply not relevant at this level. I take phrasal resyllabification, such as is found in French, to be of the same character as contraction in English, in that the rules involved are specified for a phonological environment, and that such rules are presumably optional.

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