*Linking and Intrusive r in English**

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1 Introduction

1.1 In this paper I shall present a new analysis of 'linking' and 'intrusive' r in non-rhotic English. In non-rhotic accents r can only occur prevocalically, as in <red>, <rope>, <arrive>, etc., and never before a consonant or pause. But such non-rhotic systems typically show a certain alternation of zero with r; thus while r does not appear pre-pausally in an item like <fear>, it does show up, apparently in the same item, before a vowel, as in <fea[r] of>. Whenever such an occurrence of r is recognized as 'etymologically justified' the r is termed linking (as in <fea[r] of> above); otherwise it is termed intrusive (as in, for example, <draw[r]ing> or <law[r] and order>).

Most accounts focus on linking and intrusive r in so-called 'Received Pronunciation' (RP)[1] only, and little or nothing is said about other non-rhotic accents. In what follows I shall go some way towards correcting this imbalance by considering the non-rhotic West Yorkshire (WY) accent.

Several accounts of linking and intrusive r have been proposed, notably those of Mohanan 1986, Wells 1982, Nespor and Vogel 1986, and Harris 1990. These accounts provide an adequate description of their data in each case, but, as I shall argue below, they remain, from a theoretical point of view, arbitrary and non-explanatory. In a 'non-arbitrary' account a direct and principled

*This paper is the first of two linked papers on the phonology of r in English. I should like to thank David Leslie, John Harris, Neil Smith, Jonathan Kaye and Monik Charette for discussion. The paper was first presented, in March 1991, to the London Phonology Seminar at the School of Oriental and African Studies, University of London, and thereafter to the Spring Meeting of the Linguistics Association of Great Britain at Somerville College, Oxford, also in March 1991. I should like to thank participants in both seminars for their helpful comments.

[1] It is not clear that Received Pronunciation in the strictest sense of the term exists as a living system. John Harris has suggested that 'Received Pronunciation' might better be considered to have the status of an 'ideal form'. Similar ideals exist in Arabic and in Mongolian (Charette, pc). Should RP exist as a living system, it will be a form of Standard Southern English; so, although I shall use the term 'RP' throughout, this should be understood as RP and Standard Southern English more generally.

relationship is displayed between a phonological process and the context in which it occurs.[2]

One reason why these accounts fail is that RP in isolation is a poor data base. It is a poor data source because RP speakers variably suppress intrusive r and this suppression has often been interpreted in the literature as the *phonological* absence of intrusive r. West Yorkshire speech, on the other hand, shows no suppression of so-called intrusive r. I shall argue that WY and RP do not differ as regards the grammar of r, but that amongst RP speakers intrusive r is subject to (variable) socially motivated suppression. I shall proceed on the assumption that such social suppression is not something that should be reflected in the grammatical analysis, and that in order to obtain a clear grammatical generalization we need to abstract away from such 'sociolinguistic' suppression. On the view which I shall adopt, there is no distinction between linking and intrusive r from the point of view of grammatical theory.

I shall argue below that linking and intrusive r (now seen as one phenomenon) can be interpreted as *Glide Formation*, the same process which gives rise to intervocalic j and w in WY speech. Glide Formation is an optional process, one of the options used by an English speaker to break up vowel sequences. I shall argue that once r-sandhi is viewed as Glide Formation, it is possible to provide a non-arbitrary, explanatory account of the phenomenon.

1.2 First of all, and in somewhat more precise terms, how are the labels 'Linking r' and 'Intrusive r' used in traditional descriptions of English phonology?

The terms are used in the description of non-rhotic English to describe certain instances of pre-vocalic r. The term 'linking r' is used to refer to the occurrence of r after certain vowels, namely, [ɑ:], [ɔ:], and [ə], when the following morpheme begins with a vowel. In (1) below I give some examples of linking r in RP:

(1) fea[r] of — fea*r* the

doo[r] open — doo*r* shut

fa[r] away — fa*r* from

The term 'intrusive r', like the term 'linking r', refers to the appearance of r between final [ɑ:], [ɔ:], and [ə] and a following vowel initial morpheme. As mentioned above, two distinct terms have been employed because linking r has traditionally been regarded as the historical r 're-emerging', whereas intrusive

[2]Non-arbitrariness in phonological theory is discussed in KLV 1990.

r has no such etymological justification. (2) below presents some classical examples of intrusive r, once again from RP (Gimson 1980, Wells 1982):

(2) idea[r] of

Shah[r] of

law[r] and

The use of both linking and intrusive r is optional in the examples given above. So, for example, <fear of> may be pronounced <fea*r* of>, <fea[r] of>, or <fea*r*[ʔ] of>. Wells (1982) claims that r-sandhi is the most common of the three alternatives.

1.3 The literature contains numerous accounts of linking and intrusive r. Some phonologists assume that r is present underlyingly in non-rhotic speech and that it is deleted in certain environments; a recent example of such an analysis is the account given by Mohanan (Mohanan 1986). Others suppose that post-vocalic r is *not* present underlyingly and that it appears as the result of insertion (see, for example, Wells 1982, Nespor and Vogel 1986).

In this paper I shall critically review the proposals made by Mohanan 1986, by Nespor and Vogel 1986, and by Harris 1990. I shall then present a distinct and novel account of linking and intrusive r in terms of Glide Formation.

I shall begin my detailed exploration of the literature in Section 2 below with a closer examination of the question mentioned earlier, namely, does RP have both linking *and* intrusive r, or does it, as is sometimes claimed, have linking r but not intrusive r?

2 The status of r-sandhi in RP

There is a straightforward disagreement in the literature as to whether RP shows both linking and intrusive r. Mohanan, for example, assumes that RP exhibits linking r only (Mohanan 1986); others assume that RP exhibits both linking and intrusive r (Nespor and Vogel 1986, Wells 1982). Note, however, that although Mohanan and Nespor and Vogel disagree as to the facts, the data source cited in both cases is the same, namely Gimson 1980. Gimson writes that

> ". . . By analogy, this /r/ linking usage is extended to all /ɑː ɔː ə/ endings, even when there is no historical (spelling) justification. Such intrusive /r/s are to be heard particularly in the case of /ə/

> endings, e.g. Russia and China /rʌʃərəntʃaɪnə/, . . . idea of /aɪdɪərəv/, . . . Less frequently analogous links unjustified by the spelling, are made with final /ɑː ɔː/ e.g. Shah of Persia /ʃɑːrəvpɜːʃə/, law and order /lɔːrəndɔːdə/, . . . I saw it /aɪ sɔːrɪt/, drawing /drɔːrɪŋ/ are generally disapproved of, *though it is likely that many RP speakers have to make a conscious effort to avoid the use of such forms*". (Gimson 1980, p 208, my emphasis).

(See also Wells (1982) Vol 1, Section 3.2.3 in this regard.)

It seems, then, that intrusive r is to some degree stigmatized in RP and that it is subject to a consequent suppression. By way of contrast, no stigma is attached to intrusive r by WY speakers. As mentioned already in the introduction, I shall assume in what follows that the r-sandhi phenomenon in RP and WY is identical, which means, in traditional terms, that both RP and WY have linking *and* intrusive r.[3] The linguistic analysis thus abstracts away from the intermittent suppression induced by stigmatization.

I turn now to some current accounts of the linking and intrusive r phenomenon.

3 Contemporary accounts of r-sandhi

3.1 Mohanan 1986

Mohanan (1986, p. 36) claims to be dealing with a non-rhotic accent which does not exhibit intrusive r, and cites RP. Mohanan's account attempts to handle alternations such as those in (3), (4) and (5) below.[4]

(3) (a) soar [so], soaring [sorɪŋ]

(b) saw [so], sawing [soɪŋ]

[3]The Glide Formation proposal outlined below makes precise predictions about the co-existence or non-existence of r-sandhi.

[4]Mohanan (1986) employs an American notation as opposed to the IPA system used by Wells, Gimson, Harris and the present author. In Mohanan's symbolism [o] corresponds to IPA [ɔ], [ɔ] to [ɒ], [e] to [ɛ] and [i] to [ɪ].

(4) (a) bear [beə], bearest [beərəst]

(b) idea [aidiə], ideology [aidiɔlədʒi]

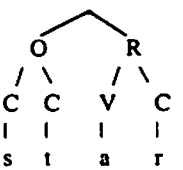
(5) (a) star [sta], star is [stariz]

(b) spa [spa], spa is [spa iz].

(Taken from Mohanan 1986, p 36. See also Durand 1990, p 126.)

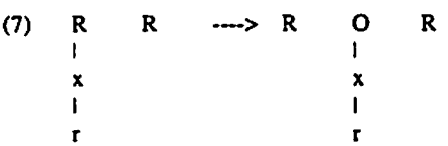
Mohanan proposes the following analysis. Following syllabification in lexical stratum 1, r is syllabified in the rhyme:

(6)



Mohanan claims that r is not allowed to remain in the rhyme and he posits a rule of r-resyllabification which applies post-lexically (Mohanan p 36):

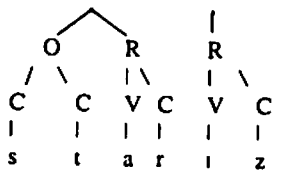
(7)



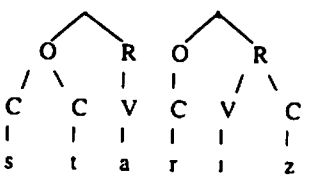
Resyllabification is possible in, for example, <star is>. At the post-lexical level Mohanan claims that the following sequence of events takes place:

(8) Post-lexical level

lexical insertion

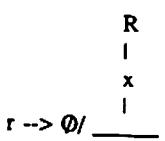


r re-syllabification



In (6) the r in <star> cannot resyllabify (for there is no immediately adjacent rhyme), but since the output does not contain r it must be deleted. Mohanan accordingly posits a rule of *r-deletion*. r-deletion (as in (9) below) is another post-lexical rule and is ordered after *r re-syllabification* (Mohanan p 36).

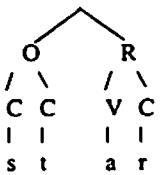
(9)



Accordingly, the item <star>, in isolation, will show the following derivation.

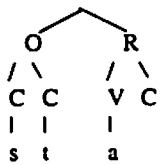
(10)

Post-lexical Level



r re-syllabification not applicable

r-deletion



As an analysis of linking r only, this account is descriptively adequate but highly arbitrary. Mohanan's account is arbitrary in the technical sense described on page 1 above. It does not establish a direct and principled relationship between the phonological processes which he posits and the contexts in which they are claimed to occur. Given the arbitrariness of Mohanan's account we should ask how much is really *explained* by that account. We might ask why it is that r cannot remain in the rhyme. Are there any other consonants which cannot remain in the rhyme, and, if not, why not?[5]

In a footnote (fn 19, p 61) Mohanan comments on the existence of intrusive r. He says that intrusive r is the result of *r-insertion*. Any system which has linking and intrusive r, on Mohanan's account, requires two post-lexical rules: one of r deletion and another of r insertion. Again, the analysis is arbitrary and non-explanatory. Why do we find 'r-insertion' at all? And what is the connection, if any, between r-insertion and the 'r-resyllabification' and 'r-deletion' rules already posited? These questions go unanswered in Mohanan's account.

3.2 Nespor and Vogel 1986

Nespor and Vogel deal exclusively with RP. They assume that RP has both linking and intrusive r and their approach has much in common with that of

[5] Compare in this regard the Licensing account given by Harris (1990) as discussed in Section 4 below.

Wells 1982. They assume that post-vocalic r is not present underlyingly in RP. In order to account for r in, for example, <sta[r] is> and <fea[r] of> etc., they propose an utterance domain rule of r-insertion (Nespor and Vogel 1986, p 229).[6]

(11) $$\emptyset \text{ ---> } r \,/ [\ldots \left\{ \begin{matrix} \text{ɑ} \\ \text{ɔ} \\ \text{ə} \end{matrix} \right\} \_\_ V \ldots]_U$$

Notice that Nespor and Vogel treat linking and intrusive r as one phenomenon. In classical generative terms, Nespor and Vogel's account is simpler than that presented by Mohanan in that it requires fewer rules.

Nespor and Vogel's analysis provides a descriptively adequate account of the data. However, there is nothing principled in the theory within which their account is formulated which rules out the possibility of a system having r-sandhi after [+ high] vowels (a system in which, for instance, <seeing> might be pronounced <see[r]ing>). Such systems are unattested, and I shall assume in my own account that they are impossible and can be excluded in a theoretically principled way.[7] There is, I believe, a good reason why r-sandhi cannot appear after a high vowel, but no such reason figures in Nespor and Vogel's account. Like Mohanan's account, the analysis offered by Nespor and Vogel is subject to the charge that it is, in the technical sense, *arbitrary*.

The next account which I shall review is that of J. Harris (1990). This account is articulated within the framework of Element Theory, as developed by KLV 1985 and KLV 1990. Before discussing and assessing Harris' account I shall present some expository remarks on Element Theory.

3 An overview of Element Theory

In SPE the ultimate constituent is the distinctive feature. KLV 1985 claim that the ultimate phonological constituent is the *'element'*. An element is pronounceable in its own right. Some segments are composed of single elements, while others are composed of combinations of elements, which is to say that they are compounds. I, U and A, for example, are three elements. As

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[6] Wells posits a more general rule of r-insertion:

$$\emptyset \text{ --> } r/[\text{-highV}]\_\_\#_0\ V$$

(Wells 1982, p 226).

[7] Jones (1989, p. 301) claims that the form <see[r]ing> is a possibility in English. He does not base this claim on observation, but refers to Wells 1982 for support. However, Jones misrepresents Wells. What Wells actually says is that <see[r]ing> is *not* a possible form (See Wells 1982 vol 1 p 223).

independently pronounceable units they correspond to IPA's [ɪ], [ʊ] and [ɑ] respectively. A compound composed of I and A, say, will give rise to [æ] or [ɛ] depending upon the status of each element in the formal operation of element combination or 'fusion'.

In the operation of fusion, one element, designated 'operator', transmits its salient property to another element designated 'head'. In the KLV formalism the fusion operation is represented by a dot symbol, '.', with the operator element (E_i below) conventionally represented to the left of the dot, and the head element (E_j below) to the right of the dot:

(12) $(E_i \ . \ E_j)$

Thus when the element I fuses with the element A two outcomes are possible depending upon which element is the operator and which is the head. When I is the operator and fuses with A as the head, then I transmits its salient property (frontness in the case of I) to A. (I.A) is accordingly taken to represent the intrinsic structure of the segment [æ] (I has fronted A). (A.I), on the other hand, is taken to represent the intrinsic structure of the segment [ɛ], because where A is the operator it transmits its salient property, non-highness, to I as head (A has therefore 'lowered' I).

KLV 1985 claim that a segment is a 2D matrix composed of horizontal lines and columns. Each line bears the name of an element.

If an element is not present then its absence is marked by what KLV 1985 call a 'cold vowel', the maximally unmarked element V, which is taken to represent a vowel of lax, high central quality[8]. The cold vowel has no salient property and can thus only have an effect on the outcome of fusion if it is the head. For example:

(13)	operator		head	RESULT
(a)	(A	.	V)	ə
(b)	(V	.	A)	ɑ

(14) represents the structure of certain vowels which occur in English.[9] [10] [11]

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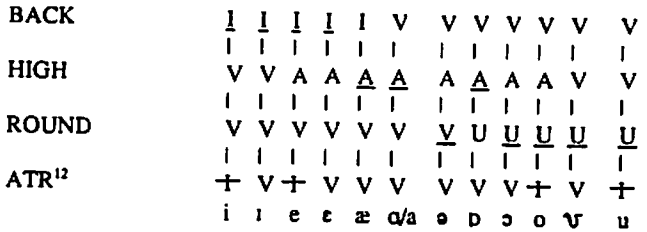
[8]KLV 1985; 1990 and Harris 1990, use the symbol v° to represent the cold vowel. My symbol V differs in two respects. First of all, I omit the charm symbol. (Charm is not a concern in this paper. See KLV 1985 for discussion.) I use capital V to avoid confusion between the cold vowel and the voiced labio-dental fricative [v].

[9]To date, only the simplest outline of vowel structure exists within element theory (see KLV 1985, 1988). The table of vowels given in (14) is meant as a rough working guide.

[10]U as operator transmits its salient property, roundness.

(14)



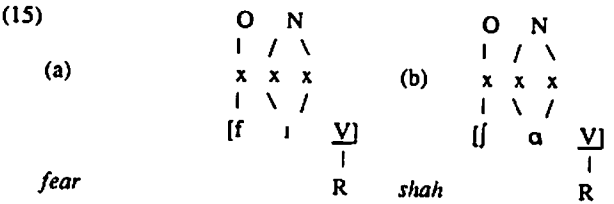
I shall eschew detailed discussion of the other elements here except for the element R.[13] On its own, R is realized as a tap. In combination its salient property is coronality.

So much for Element Theory. I turn now to the exploitation of this theory in a new and extremely interesting account of the linking and intrusive r phenomenon, the account developed recently by Harris.

4 Harris (1990)

Harris claims that r is underlyingly present as a *floating segment*. According to Harris, the lexical entries of <fear> and <shah>, for example, have the following forms:

(15)



[11]The underlined element is the head of the segment.

[12]The symbol for ATR in recent Element Theory (namely,ꟷ) is not well chosen. In the IPA tradition this symbol denotes the lower high congener of cardinal 17, [ɨ]. It is odd that a symbol often used to represent a lax vowel should now be selected to represent ATRness. Worse, IPA [ꟷ] represents the very vowel which in Element Theory is represented by the symbol [v°], ie the cold vowel.

[13]See Harris (1990); KLV 1985, 1990.

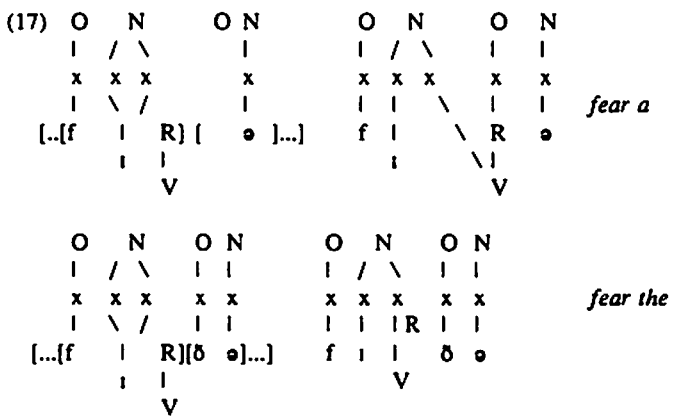
The segment r has the cold vowel (V) as its head, with the coronal element (R) as its operator.

Harris proposes that the non-rhotic system under consideration in this paper is constrained by the following stipulation:

(16) r is only licensed in an onset.

The claim, then, is that the licensing stipulation (16) acts to break up the element structure of floating r. When the cold vowel head of that floating segment is absorbed into the nucleus the R element is 'de-fused' or delinked from the cold vowel. The floating segment r is thus replaced by a *floating element* R. If, however, an empty onset[14] is available, then the element R in some way triggers creation of a skeletal slot linked to that onset, and anchors to that skeletal slot. This is illustrated in (17) below, which I reproduce from Harris (1990) p. 49.

(17)



Notice that, on this account, both the surface schwa and the r in, for example, <fearing>, when realized as [fiəɹɪŋ], derive from underlying floating r, the element structure of which has been *linearized* in the derivation.

[14]Many phonologists from different theoretical backgrounds accept the notion of a degenerate syllable having an empty onset position or an empty nuclear position. See for example, Selkirk 1981, Goldsmith 1989, Leslie 1989, 1990, Kaye 1990. Phonologists differ, however, as to the 'content' of empty positions. For some the empty position is a truly contentless position. Others, such as KLV 1990, claim that the empty nucleus has content, namely the cold vowel.

Whatever can be said in favour of this account, the licensing stipulation upon which the analysis depends remains, from an explanatory point of view, ad hoc. There is a logical need to connect the licensing stipulation with some deeper principle if the analysis is to be, in the technical sense, non-arbitrary. This need is accentuated by the implausibility, on general phonological grounds, of the licensing claim involved. The segment r is, after all, the most vowel-like of consonants, and so, one might think, the *least likely* to be barred from membership in the rime. As the analysis stands at present, however, the licensing stipulation remains unrelated to any more fundamental consideration. Without derivation of the licensing restriction from a deeper principle no direct link is established between phonological process and conditioning context *in a principled way*, and the analysis therefore remains in the technical sense arbitrary.

One of the purposes of the present paper is to provide an explanatory, non-arbitrary account of the linking and intrusive r phenomenon, where previous accounts have fallen short. Consider now an alternative and extremely simple analysis of linking and intrusive r.

5 The glide formation hypothesis

5.1 My proposal is that occurrences of so-called linking and intrusive r are manifestations of the same glide formation process which gives rise to the [j] in (for example) <see[j]a> and also to the [w] in (for example) <do[w]ing> in West Yorkshire phonology.

In West Yorkshire phonology, when a vowel final stem is followed by a vowel initial morpheme a glide may optionally appear. For example:

(18) see a [si:jə] be on [bi:jɒn]

Sue on [su:wɒn] do it [du:wɪt]

with him (wi'im) [wi:jɪm] vs

with my (wi' my) [wɪ mɪ].

Why does the glide appear only when the following morpheme begins with a vowel? (Contrast <with my> and <with him> above.)

Let us assume, in accordance with much recent theory, that all vowel initial words are preceded by an empty onset.

```
        O     N
              |
(19)          x
              |
              a
```

On this view of syllabification, then, there is no such thing as a syllable of the form N. ON is the basic irreducible syllable structure.[15]

If an empty onset position is present it provides a means of breaking up a sequence of vowels. Consider the WY examples
see him [si:jɪm] vs *see my* [si:mɪ] in (20) and (21) below.

(20)

```
        O   N     O N O N
        |  / \      | | |
(a)     x  x x      x x x
        |  \ /      | |
   [[   s   i ] [   ɪ m    ]]
```

Following bracket erasure, we have:

```
        O   N   O N   O   N
        |  / \  | |   |   |
(b)     x  x x  x x   x   x
        |  \ /  | |   |
        s   i   j ɪ   m
```

(21)

```
        O   N     O   N
        |  / \    |   |
(a)     x  x x    x   x
        |  \ /    |   |
   [[   s   i  ] [ m   ɪ ] ]
```

Following bracket erasure, we have:

[15]For a radical reinterpretation of English syllabification based on a detailed metrical analysis, see Leslie 1989. Leslie argues, on purely metrical grounds, that the underlying syllabification of English is of the form ON.

(b)
```
    O   N   O   N
    |  / \  |   |
    x  x  x  x   x
    |  \ /  |   |
    s   i   m   ɪ
```

We can now say why it is that a glide appears only when the following morpheme begins with a vowel. The reason is that a glide can appear only where there is a position available for it to occupy. Arguably, then, the appearance of j and w provides evidence for the existence of empty onset positions.

On this view, the j glide fills an empty onset when the immediately preceding vowel is [i] and the w glide fills an empty onset when the immediately preceding vowel is [u]. It has been quite standard within contemporary phonology to consider r to be a glide. Given that a j glide appears after [i] and a w glide appears after [u], it seems strange that the appearance of the post-alveolar median approximant after [ɑ: ɔ: ə] should be treated as a phenomenon wholly distinct from j and w glide formation. The natural assumption is that j appears after high front vowels, w after high back vowels, and r appears after non-high vowels. (I shall argue below, however, that Wells' [-high] requirement is not restrictive enough, and, furthermore, that the high front and high back requirement for j and w respectively is too restrictive.)

Consider, once again, linking and intrusive r in RP. Linking and intrusive r in RP is recorded after the [-high] vowels [o: ɔ: ə]. What happens after other non-high vowels such as [e ɛ æ a ʌ ɒ o]? RP does not help here, because in that system [ɛ æ a ʌ ɒ] never occur in final position and [e] and [o] form diphthongs ([eɪ] and [əʊ] respectively). If we consider the WY data, however, it becomes clear that [-high] is not restrictive enough. First of all, we may begin by considering those vowels closest to [o: ɔ: ə] in RP in (a), (b) and (c) below.

(a) Schwa in WY behaves as it does in RP. Examples such as <fea[r] of>, and <idea[r] of>, and so on, are found in both accents.

(b) [ɑ:] is not a vowel in the WY system under consideration. The equivalent WY vowel is [a:], another non-high vowel. This vowel behaves in exactly the way that [ɑ:] behaves in RP; so, for example, <far away> is pronounced [fa:ɹəwe:] in WY and <Shah of Persia> is pronounced [ʃa:ɹəfpɜ:ʒə].

(c) [ɔ:] is interesting in WY phonology where it is often characterised as a lowered half-open vowel [ɔ̞:]. In fact, the most accurate phonological characterisation of this vowel may well turn out to be [ɒ:]. Consider the

classical example <law and order>. Items such as <law> and <raw> in WY belong to two lexical sets. They can be pronounced with either [ɒ:] or [ɒʊ]. If they are pronounced with long [ɒ:], as in [lɒ:] and [ɹɒ:] then Glide Formation produces r; but if, on the other hand, these items are pronounced [lɒʊ] and [ɹɒʊ], it is the w glide which is produced as a result of glide formation.[16] It is also possible to find instances of short [ɒ] giving rise to both linking and intrusive r in WY as in

(22) for a [fɒɹə] and

was it [wɒɹɪt] was my [wɒ mɪ].

Up to this point, then, WY and RP behave in the same way. But what happens to other non-high vowels? Unlike RP, WY does have other non-high vowels in positions where they might trigger glide formation. The vowel [ɛ] is an example and gives rise to r in, for example, <yes it is> [jɛɹɪt ɪz].

WY also has the vowels [e:] and [o:]. It will be clear that data items ending in [e:] and [o:] are especially interesting in that they should both give rise to r if Wells 1982 is correct (see above fn 7). What we find, however, is that they do *not* give rise to r as predicted by the Wellsian rule, and instead we find the following.

(23) pay me [pe: mɪ] pay as [pe:jəz]

go to [go: tə] going [go:wɪn][17]

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[16]On Harris' account, words such as <law> and <raw> would each have two separate lexical entries [lɒʊ], [ɹɒʊ], and

```
[lɒ:V]   [ɹɒ:V]
   |        |
   R        R
```

respectively. A simpler account assumes one underlying form per word and this is the position being developed here. On my approach, the resulting glide depends upon which form of the vowel surfaces, [ɒ:] or [ɒʊ], but the first is arguably a transformational derivative of the second.

[17]Consider the following examples where [o] may reduce to [ə]. If [o:] remains and gliding occurs, the result is [w]. If, on the other hand, [o] reduces to [ə], the result is [r]:

yellow and [jɛlowənd]
[jɛləɹənd]

Clearly [-high] in Wells' rule is not restrictive enough. It appears that a non-high, *lax* trigger is required for r-formation. We can no longer claim that j and w occur only after high tense vowels, for [e:] and [o:] are non-high, tense vowels. Instead we must say that j and w occur after *non-low*, tense vowels.

Why, then, does j occur only after non-low, tense, front vowels, w only after non-low, tense, back vowels, and r after non-high lax vowels? Presumably, some aspect of the final vowel may optionally spread into the following empty onset position forming a glide.[18] In the final section of this paper I shall take up this claim and consider what precisely might be spreading.

Such a proposal comes with a number of consequences. In particular, it makes precise predictions about which glide can occur after which vowel. Clearly, r can be ruled out in an example such as <seeing> in a theoretically principled way. The properties of [i:] can only spread to form j as [i:] does not contain the properties necessary to give rise to r or w. Therefore, <see[r]ing> and <see[w]ing> are ruled out.

In relation to linking and intrusive r, more particularly, such a characterization of r-sandhi predicts that systems can have either linking and intrusive r or neither, but linking without intrusive r is not possible.

In what follows I shall tentatively consider how my proposal may be implemented in Element Theory[19].

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window is [wɪndowɪz]
[wɪndəʊɪz]

Once again, Harris would have to claim two lexical forms for words such as these, only one of which would contain the floating r segment.

[18]If r by Glide Formation is optional, what is the status of r in examples such as <fearing>, <boring> etc? If we compare (a) <fearing> with (b) <fear of> and (c) <drawing>, we find that r is obligatory in (a) but optional in (b) and (c). The fact that r is not optional in <fearing> may suggest that it is not an instance of Glide Formation but rather an instance of underlying r. I develop this suggestion in the second of my two papers on the phonology of r in English. I thank David Leslie for discussion of this and other points.

[19]In Broadbent (1991c) I compare the implementation of Glide Formation in Element Theory with its implementation in Feature Geometry.

5.2 We may begin by considering the formation of j and w in WY phonology.

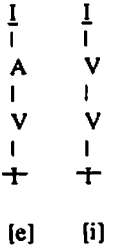
[j] formation

We have already seen in (18) and (23) above that the glide [j] may optionally appear in examples such as
<see[j] a>, *<be[j] a>* and *<pay[j] as>*.

In classical feature theory, the features [-low, +tense, -back] must be spreading into the empty onset to give rise to j.

What account can be given in Element Theory? If we consider the elemental composition of the vowels immediately preceding [j] we can see that they share a common head, namely the element *I*.

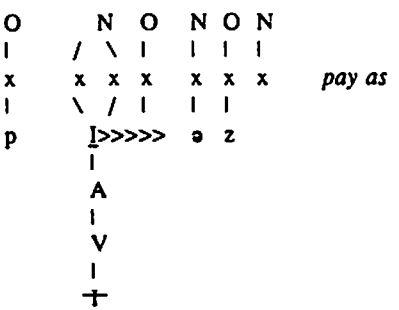
(24)



[e] [i]

We may therefore say that when the element I spreads into the following empty onset the result is [j]. See (25) below.

(25)



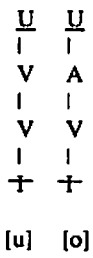
pay as

[w] formation

In (18) and (23) above we saw that examples such as <do[w] it>, <Sue[w] on> and <go[w]ing> provide examples of w-formation.

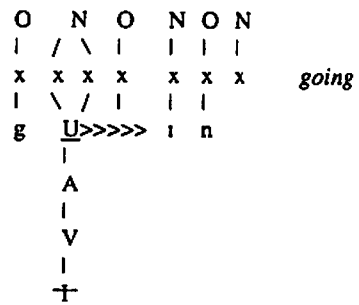
On a feature based account it is the features [-low, +tense, +back] that are spreading to produce the glide w. What account, again, is possible in Element theory? The elemental composition of the vowels that occur before the glide w reveals that the element U is the head of all vowels which occur before [w].

(26)



We may therefore say that when the element U spreads into an empty onset the result is [w]. This process, as it involves U, is illustrated in (27) below.

(27)



going

r-formation considered in classical feature theory is the spreading of the features [-high, -tense]. In an element-theoretic account, which element spreads to give rise to r?

We have already seen that linking and intrusive r appear after the [-high] vowels [ɛ,ə,ɑ/a,ɔ,ʊ]. The elemental composition of these vowels is displayed in (28).

(28)

I	V	V	U	U
A	A	A	A	A
V	V	V	V	V
ɛ	ə	ɑ/a	ɔ	ɒ

Might it be the cold vowel that is spreading to form r? If we assume that it is indeed V that spreads, then we have to be able to explain why it does not spread in examples like <going>, and <see it>, since they also contain V.

Might it be A that is spreading to form r? All the examples of r-formation given above do contain the element A. However, in (28) above, A is an operator in some vowels and a head in others. Might it be that I and U spread when they are heads providing they are not in combination with A? This would mean that whenever A is present it takes precedence over I and U.

Once again, [e:] and [o:] items turn out to be crucial. We have seen above that in WY <pay as> and <going> give rise to j and w respectively. Clearly, if A took precedence it would do so in examples such as these and we would obtain *<pay[r]ing> and *<go[r]ing>. These are not possible forms in WY.

The simplest assumption to make is that r-formation occurs when A is the head of a relevant segment[20]. On this assumption, r formation is like j and w formation: the element which is the head of the affecting segment may spread into a following empty onset. This is illustrated below:

(29)

O	N	O	N	O	N	
x	x	x	x	x	x	x
ʃ	A>>>>>		ə	v		*shah of*
	V					

There is one final point which needs to be considered. Within Element theory, an element can have head or operator status. I, U and A spread into empty onsets to give j, w and r respectively when they are heads. However, it does not follow that when I, U and A spread they spread as heads (ie spread to form head position in the newly formed onset segment); it is equally possible that they will spread as operators (ie spread to operator position in the newly formed onset segment).

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[20]Although this assumption enables us to account for r-formation it raises questions regarding the elemental composition of all non-high vowels, and clearly this requires further work.

If the following onset is truly contentless, no element can spread into that onset as an operator because in order to do so the onset must provide the spreading element with a head. However, if the onset is not truly empty, the question becomes nontrivial.

Following Kaye 1990, I shall assume that in the lexical entry of vowel initial words the onset is truly empty, but that the creation of a skeletal point guarantees the appearance of the cold vowel.

Notice now that whether I or U spread to form head or operator positions, the result is the same:

(30)	OP	HD	RESULT
	(I	. V)	j
	(V	. I)	j
	(U	. V)	w
	(V	. U)	w

This is not the case, however, as regards element A. If A spreads as the head the result will be ɑ. If, on the other hand, A spreads as an operator the result will be schwa. There is some evidence to suggest that schwa in an onset is realized as r (see Lindsey and Broadbent forthcoming).[21] I shall, therefore, assume that I, U and A spread as operators, which is to say that they spread to operator position in the newly formed onset segment.

Conclusion

In this paper, I have considered five approaches to one of the classical problems of English phonology, the linking and intrusive r phenomenon.

Four of the accounts (Mohanan 1986, Wells 1982, Nespor and Vogel 1986 and Harris 1990) are descriptively adequate, but, in the technical sense, phonologically arbitrary and non-explanatory.

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[21]A question now arises as to the source of *coronality* in the r segment created by Glide Formation. The account of r-sandhi presented in this paper arguably provides further evidence for the coronal underspecification thesis developed in Avery and Rice (1989) and in Paradis and Prunet (1989). Avery and Rice claim that coronality is assigned by phonetic default rule. (See Broadbent (1991c) where coronal underspecification in English is considered in greater depth.)

The fifth proposal, namely that linking and intrusive r can be characterised as *Glide Formation*, arguably provides a non-arbitrary, explanatory account. The Glide Formation account is non-arbitrary precisely because the appearance of r is directly related to the context in which it occurs. On this approach it is some property of the final vowel which spreads into the following empty onset. Notice that the relation of structural change to conditioning context upon which this explanation depends is established for a range of phenomena which properly include the relevant r cases, and is not simply restricted to those cases. The explanatory relation is thus established at an appropriate level of generality.

I have suggested that perhaps the main reason why such a characterization has not been proposed before is that a system subject to a peculiar form of sociolinguistic suppression, RP, has been the focus of inquiry, and that such a system in isolation forms a poor or misleading data base. Once RP is placed alongside an accent which does not attach a stigma to linking and intrusive r, the underlying linguistic system is revealed, and the process can be seen for what it is, namely, a simple case of Glide Formation.

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