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NON-RHOTICITY OR WHERE IS
THE HISTORICAL *r* LURKING?

The aim of the paper is to explore two sandhi phenomena of *r*-zero alternation, i.e. linking and intrusive *r*. We address the question of lexical representation of etymologically *r*-less and *r*-full forms participating in the processes. Moreover, we discuss the influence of historical *r* on both vowel quality and quantity and explain some developments of etymologically *r*-full forms which have led both to the confined distribution of *r* and various vocalic reflexes in non-rhotic dialects.

1. Introduction

A well-known fact about Modern English is that there are two general patterns concerning the distribution of the sonorant *r*. The difference boils down to the unlimited vs. limited occurrence of the *r* segment and entails two realization variants. In the rhotic pattern, generally associated with the United States, Canada, Ireland and Scotland, *r* is pronounced with some degree of consonantal constriction and appears in all of the phonological contexts. It may surface in one of the following forms: as an approximant, *r*-coloured vowel [ɚ] or a tap. In the non-rhotic pattern, which involves southern England, Australia, New Zealand but also some parts of the eastern and southern United States, the contextual freedom of historical *r* is severely limited. Shortly put, in the latter group historical *r*, in half of the contexts, either shows up as a vocalic reflex or disappears altogether. Furthermore, in the non-rhotic dialects there are some interesting *r*-related observations. One of them is the *r*-zero alternation, a typical sandhi phenomenon where the alternating variants depend on whether a vowel or consonant follows, e.g. *far above* [fɑːr əˈbʌv] and *far below* [fɑː brˈləʊ]. The *r* alternant showing up in this particular context is known in the literature as linking *r*. This process has an extension in the form of the so-called intrusive *r*. The process consists in the realization of constricted *r* in etymologically *r*-less forms again depending on the following context, e.g. *draw it* [drɔːr ɪt] and *draw the* [drɔː ðə]. Finally, in both groups of dialects, i.e. rhotic and non-rhotic, the set of vocalic contrasts before historical *r* is

radically different from that found before other consonants. In other words, we can notice a direct influence of the historical *r* on both vowel quality and quantity. For instance, in the majority of rhotic dialects, excluding Scottish English, the vocalic inventory in the context of the following *r* is sharply reduced. Moreover, in the same context the short-long vowel oppositions are neutralised. The same observation holds true in non-rhotic dialects with the difference that in the latter group *r* is phonetically suppressed[1].

In this paper, due to space limitations, we discuss only those dialects which display both the aforementioned phenomena, i.e. linking and intrusive *r*. Since, as Harris (1994: 232) notices, the vast majority of southern British standard speakers use the variety with both linking and intrusive *r*, the selection of this dialect for our purposes seems reasonable. In what follows, we address some questions concerning the distribution, representation and interaction of *r* with the preceding vowel. Moreover, we try to explain the mechanics behind the *r*-zero alternations. Specifically, we explore the problem of lexical representation of etymologically *r*-less and *r*-full forms participating in the process of linking and intrusive *r* (Section 5)[2]. Intuitively both processes seem related and as such should be given a uniform account. The intuition, as will be shown below, is confirmed by the results of the analysis. From the point of view of the thematic scope of this paper, the understanding of the historical development of *r*-full forms seems both crucial and indispensable. Therefore, in Section 4 we present the analysis of historical facts which are the cornerstone of non-rhotic dialects.

The analysis of both diachronic and synchronic facts is couched in the recent development of Government Phonology known as the Strict CV model (Lowenstamm 1996, Rowicka 1999, Cyran 2003, Scheer 2004) and the Element Theory which deals with the elemental make-up of phonological segments (Harris 1994, Harris and Lindsey 1995, Cyran 2003) (Section 3). We start the discussion by presenting some basic facts concerning the realization of historical *r* in non-rhotic dialects in the immediately following section.

2. Reflexes of historical *r* in southern British dialects

The only context in which the approximant *r* occurs in southern British is the prevocalic position. It means that *r* is allowed in the word-initial and word-internal onsets of branching and non-branching type, e.g. *reap* ['riːp], *creep* ['kriːp], *carrot* ['kærət] and *confront* [kənˈfrʌnt]. In all other positions historical *r* appears in some form of a vocalic reflex. Thus, it may be realized as a lengthened non-high vowel or a post--vocalic glide, e.g. *far* [fɑː], *cork* [kɔːk], and *bear* [beə], *beard* [bɪəd], respectively. It follows that constricted *r* is not allowed before a consonant and the pause; it appears

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[1] For a detailed discussion and comparison of various vocalic systems in the context of historical *r* see, for example, Giegerich (1992) and Harris (1994).

[2] For a critical discussion of earlier analyses of the same facts see Harris (1994).

only if followed by a vowel. The latter observation is confirmed by frequent *r*-zero alternations. The approximant *r* shows up whenever the conditions are satisfied both across morpheme-boundary, e.g. *hearing* [hɪər ɪŋ] vs. *hears* [hɪəz] and word-boundary, e.g. *hear about* [hɪər ə'baʊt] but *hear to* [hɪətu]. In the latter case, the *r*-full alternant is optional but, as noted by many commentators, a preferred one (Harris 1994: 234). Summing up, some etymologically *r*-full words never contain consonantal *r*, e.g. *beard* [bɪəd], while others alternate between an *r*-less and *r*-full variant, e.g. *hear* [hɪə] *hearing* [hɪər ɪŋ]. The alternation in question is known as linking *r* where the approximant variant shows up pre-vocalically, while the zero alternant appears before a consonant or the pause. Interestingly enough, the approximant *r* is also possible in the etymologically *r*-less forms. Similarly to linking *r*, the present alternation is conditioned by the same trigger, i.e. the presence or absence of a following vowel and arises at the morpheme-boundary, both word-internally and finally, e.g. *drawing* ['drɔːr ɪŋ] vs. *draws* ['drɔːz] and *draw it* ['drɔːr ɪt] vs. *draw them* ['drɔː ðəm]. Crucially, the alternation in question, the so-called intrusive *r*, never appears if the morpheme final vowel is high or up-gliding, e.g. *see all* or *say again*, etc. In other words, the occurrence of intrusive *r* depends on the vowel quality in the morpheme final position, i.e., it must be one of non-high vowels. Note that the presence of both processes in a single system is responsible for frequent occurrences of homophones, e.g. *sore of* and *saw of* [sɔːr əv]. The difference between these two forms is that the former, unlike the latter, contains *r* which is etymologically justified. Some immediate questions would be whether both types of *r* are phonologically different or, more crucially, whether they are lexically present and if yes, what is their representation? The latter two questions do not apply to morpheme-internal *r*-less forms, e.g. *beard* [bɪəd] and *cork* [kɔːk]. Since *r* never alternates with zero in this position, it is lexically absent[3]. Morpheme--finally, however, the presence of *r*-zero alternations calls for the lexical representation. Moreover, the close dependency relation between intrusive *r* and the preceding non--high vowel is also a mystery. Finally, the effects the historical *r* imprints on the preceding vowel deserve a mention. Recall that the sub-system of vowels before historical *r* is severely curtailed. Apart from long non-high vowels *far* [fɑː], *more* [mɔː], *work* [wɜːk], in this set we find centering diphthongs *dear* [dɪə], *dare* [deə], *poor* [pʊə][4]. It can be easily noticed that the influence historical *r* exerts on preceding vowels boils down to lowering and loss of tension effects. In order to be able to explain the latter effects and answer some of the questions posed above, we have to look back at the origins and development of non-rhotic dialects. The historical journey, however, must be postponed until we introduce theoretical model applied in this paper.

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[3] Note, however, that before it disappeared, *r* merged with the preceding vowel in this context, see the discussion below.

[4] As noted by Harris (1994: 243) particular systems may differ as far as the actual number of in-gliding diphthongs is concerned. Thus, aside from [ɔə] (also [ɔː]) which can be heard in the realization of the latter example, i.e. *poor*, we may encounter [æə] and [ɑə] as in *wire* and *hour*, respectively.

3. Theoretical framework

3.1. Strict CV

The Strict CV model views syllable structure as strictly alternating sequences of non-
-branching onsets and non-branching nuclei hence, there are no branching constituents,
no rhymes and no codas. This, among many other things, means that empty positions
must play an indispensable role in this approach. Note that each consonant cluster is
separated by the empty nuclear position and word-final consonants are not final at all
but followed by the empty nucleus. One of the conditions on the distribution of empty
nuclei in phonological representation is that they cannot occur in sequences (*ø–ø).
Moreover, nuclei distribute prosodic licensing within the phonological word. This means
that at the constituent level each onset must be licensed by a nucleus.

In the Strict CV model syllabification follows from the asymmetrical relations be-
tween two segments. Thus in a sequence of an obstruent (T) and a sonorant (R) both
consonants must contract a dependency relation where the more complex segment (the
governor) governs a less complex one (the governee)[5]. We should bear in mind that
the governing relations between consonants are contracted across melodically empty
nuclei. Such nuclei, as locked within governing relations, are not visible to phonologi-
cal processes and do not violate the constraint on sequences of empty nuclei (*ø–ø).
For a meticulous discussion and presentation of the Strict CV model, along with the
comparison with other theories (including Government Phonology) the reader is re-
ferred to Szigetvári (1999), Rowicka (1999), Cyran (2003), and Scheer (2004).

3.2. The Element Theory

In the Element Theory phonological segments are built out of privative cognitive units
called elements. Elements, unlike the traditional features, are large enough to be pho-
netically interpretable when they occur alone in a segment. The only condition an ele-
ment is required to satisfy in order to be pronounced is that it must be linked to
a skeletal slot. It follows that the single element (I), for instance, linked to a nuclear
slot is realized as the vowel [i]. The same element attached to the onset position is
pronounced as the approximant [j]. It does not mean that elements do not combine
with one another, quite the contrary, they can appear together in a single segment forming
a complex structure. Thus, the two mid vowels [e] and [o] are combinations of (A.I)
and (A.U) respectively. Furthermore, in richer vocalic systems maintaining the oppo-
sition between lax and tense vowels it is headedness that is utilised to mark this con-
trast. Thus, a single-element tense vowel [i] is represented as headed (I̲), while its lax
counterpart [ɪ] as headless (I._). A similar asymmetric head-operator relation is found

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[5] Segments are composed of elements and complexity is gauged from the number of elements
a given segment contains (see the discussion in 3.2 below).

in the phonological compounds of closed and open mid vowels, that is, [e] and [ɛ] respectively. Thus, a headless compound (A.I._) defines the open mid vowel [ɛ], the same compound headed by (I), that is, (A.<u>I</u>) refers to the closed mid vowel [e]. Note that in such a system the front open vowel [æ] can be represented by the same compound headed by the element (A), which yields (I.<u>A</u>). Finally, there have been some discussions concerning the representation of the neutral vowel, that is, schwa. The representations vary from a totally empty position (_), or the realisation of the neutral element (@)[6], to a headless structure with one of the resonance elements in the operator position, e.g. (A._). The findings in the following sections put us in the position of the latter option proponents. The three resonance elements (I), (A), (U) defining vocalic segments are active place definers in consonantal systems (1a). However, in order to describe consonants some additional primes are required, that is, manner elements (1b).

(1) a. *place elements*
      U – labial, labialised
      I – palatal, palatalised
      A – coronal, retracted (uvular, pharyngeal)
      _ – velar, velarisation

    b. *manner elements*
      ʔ – occluded
      h – noisy
      N – nasal
      H – voiceless aspirated
      L – fully voiced

The elemental make-up of phonological segments can be affected in phonological processes which boil down to two operations. Thus, spreading or composition consists in the addition of elements, while the result of delinking or decomposition is the deduction of elements. Both operations must have a local trigger or source and can be observed in vocalic as well as in consonantal systems. This can be illustrated by spirantisation, a process often resulting in elision and involving the lenition of a stop to a glottal fricative, usually through a fricative stage, e.g. [t] > [s] > [h] > [ø] = (A.h./) > (A.h) > (h) > (_). Similarly, in vowel reduction the elemental material is stripped away or the element status is reduced from head to operator, e.g. [o] > [u] = (A.U) > (U) and [i] > [ɪ] = (<u>I</u>) > (I._) respectively.

Summing up, vocalic as well as consonantal segments are composed of elements which may be affected by the position they occupy in the syllable structure. The elemental make-up of a segment may be altered by adding a locally present element or by reducing the internal composition of a segment[7].

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[6] It has been suggested that there is a fourth element, that is, the neutral element (@) which is present in all vocalic representations but only shows up if the other elements are absent (Harris and Lindsey 1995).

[7] For more information and an ongoing discussion concerning the elemental make-up of phonological segments see, for example, Harris and Lindsey (1995), Scheer (2004), Charette and Göksel (1996), Cyran (2003), Nasukawa (2000), Ploch (1999), van der Torre (2003), Botma (2004) among others.

4. Quantitative changes in Early New English

4.1. Vowel lengthenings

After the Great Vowel Shift, which marks the transition from Middle English to New English, a set of developments took place leading to the appearance of a new class of vocalic segments, i.e. centring diphthongs. The developments had the form of both qualitative and quantitative changes. Note that the massive quantitative restructuring which occurred in this period was a general phenomenon affecting vowels in various contexts. Thus, vowels were lengthened before the word-final fricatives /f, θ, s/, e.g. [a] > [ɑː] in *chaff, bath, glass*, and [o] > [ɔː] in *moth, cross*. The same lengthening appeared before consonant clusters where the first of the consonants was one of the above mentioned fricatives or a sonorant followed by an obstruent, e.g. [a] > [ɑː] and [o] > [ɔː] in *craft, past, gasp, mask, answer, demand, dance, loft, frost*. Additionally, and more crucially to our analysis, the lengthening also affected the vowels before *r*. The latter development, however, differs from the former ones in that it was triggered by first the weakening of *r* in certain contexts and then the appearance of the glide [ə] before the trill. This could be compared to the lengthening before the lateral in the word-final and pre-consonantal position, which had its beginning in the 15th century. In this context, i.e. between the back vowel and the dark *l*, a transition glide [u] developed. The diphthong [au] survived in forms where it was followed by the consonant cluster of the lateral+labial type. In this position the dark *l* was eventually lost and the diphthong monophthongized to /ɑː/. Since, however, our discussion in this paper concerns historical *r*, let us concentrate only on those changes which occurred before *r*.

4.2. Vowel developments before r

As it was mentioned before, in the Early New English period the realization of *r* began to change. Thus, a formerly trilled consonant became a more open one (an approximant) and disappeared altogether when word-final or pre-consonantal. Moreover, the latter phenomenon, i.e. *r* weakening, affected the preceding vowels, both short and long, which ended up as lower and more central. What is interesting, however, is that some researchers (Wełna 1978 after Wright 1924, Kurath 1964 and Prins 1974) assume the appearance of the transition glide [ə] between the vowel and *r*, which resulted in the rise of some kind of a diphthong consisting of a vowel plus [ə][8]. The developments occurred in words like *far, art, arm, bark*, etc., and may be schematically illustrated as [far] > [faᵊr] > [faə/faːr] > [fɑː]. In the same fashion, the vowel [o] before *r*, in words like *cord, fork north,* and *short*, was diphthongized and eventually lengthened with the subsequent loss of *r*, e.g. [kord] > [kɔᵊrd] > [kɔəd/kɔːrd] > [kɔːd]. The existence of

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[8] For the opposite view in which the glide is perceived rather as a replacement sound than a transition glide, see Gimson (1970).

intermediate forms, i.e. those with the glide and *r*, may be confirmed by contemporary rhotic dialects discussed in Harris (1994: 256). Thus, in certain dialects the forms *far* and *poor* are realized as [fɑər] and [pɔər], respectively. Furthermore, the high vowels [i, u] and the mid vowel [e] when followed by *r* coalesced into [ɜ:] in, for instance, *bird, first, burst, nurse, person,* and *certain.* A similar situation occurred when *r* was preceded by a long vowel. Note that in such a case there was no lengthening as the vowel was originally long. Instead, we can observe the loss of tension and diphthongization, hence, [i:/u:] + *r* > [ɪə/ʊə] in, e.g. *beer, cheer, deer* and *pour, poor, door,* etc. Later on, the [ʊə] diphthong in the latter forms underwent further lowering winding up as [ɔ:] or [ɔə]. In this way it merged with another pattern characteristic to this period, i.e. [ɔ:] + *r* > [ɔ:r/ɔə] in forms like *lore, more,* and *boar.* The former lowering phenomenon can be observed in contemporary English where two competing forms exist side by side, e.g. *sure, pure* [ʃɔ:], [pjɔ:] and alternative [ʃʊə], [pjʊə]. And lastly the front long non-high vowels, similarly to the vowels described above, underwent diphthongization, that is, [ɛ:/æ:] + *r* > [ɛə] in, e.g. *pear, tear, bare, care,* etc. Summing up, in the Early New English the word-final and pre-consonantal *r* was weakened and subsequently disappeared altogether around the 18th century. Before it disappeared, however, *r* left an audible trace in the form of the realization changes affecting the preceding vowels. Thus in this context both short and long vowels faced some qualitative and quantitative developments. There is yet another possibility, perhaps *r* has never been lost but rather it merged with the elemental make-up of preceding vowels and is still present in the lexical representation of the historically *r*-full forms. This idea is developed in the immediately following section.

4.3. Pursuing a solution

The preceding section introduced the most important facts concerning some historical developments which occurred in the context of the following *r*. Generally speaking, short vowels were lengthened, while long vowels underwent diphthongization. The lengthening of short vowels before *r* could be perceived as the extension of the general phenomenon of lengthening found before fricatives (see above). Note that *r* used to be a trill, i.e. it was realized phonetically with an audible friction which puts *r* in line with the rest of the fricatives[9]. This idea is supported by Wełna (1987: 215) after Wright (1924), Wyld (1921) and Jassem (1953). However, there are some aspects of the lengthening before *r* which separate it from the lengthenings before other fricatives. Firstly, the former, unlike the latter, went through a diphthongization stage. And secondly, *r*, unlike the fricatives, was finally lost. Furthermore, neither of the lengthenings described above can be analysed as the compensatory lengthening phenomenon. This is because the vowels before fricatives are lengthened without the loss of the following consonant and, in the second case, the loss of *r* is preceded by the appearance of the glide,

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[9] Note also the similarities between *r* and other fricatives in the phenomenon known as the Aitken's Law in contemporary Scottish (Aitken 1962, 1981).

hence, [far] > [faᵊr] > [faə/faːr] > [fɑː]. In other words, the first step of the lengthening was the weakening of *r* and the glide development. How can we account for the glide appearance and later developments? The solution lies in the internal structure of *r*. In the Element Theory *r* is composed of a single element (A). Bearing in mind that *r* was pronounced as a trill (with audible friction), we propose to represent this consonant as the headed element, i.e. (A). In other words, the hededness of the resonance element is responsible for the effect of friction. This is not an uncommon situation as the same solution was applied to the analysis of Welsh fricatives (Cyran 1997, 2003). Now, the weakening which affected *r* can be explained as a typical reduction phenomenon where the element status is changed from head to operator. Thus (A) is weakened (defused) to (A._). Crucially, the weakening occurred in certain context only, i.e. in the word--final and pre-consonantal position. Note that in the Strict CV model these two con-texts are unified into one – before the empty nucleus. This is a typical weak position where lenition processes occur cross-linguistically[10]. In this way we can establish a direct link between the context and process, i.e. *r* weakens in a weak prosodic posi-tion. Furthermore, together with the weakening we can observe the development of the preceding glide (2a) and the subsequent loss of *r* (2c) and (2d). In (2b) the representa-tion of the alternative, intermediate form is given, i.e. with the long vowel before *r*.

2.

a. [faᵊr]   ↓   b. [faːr]
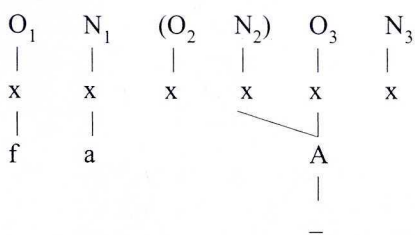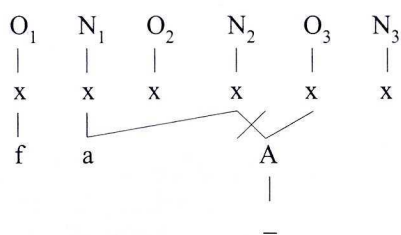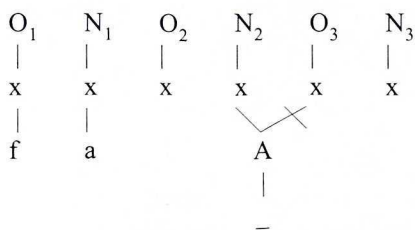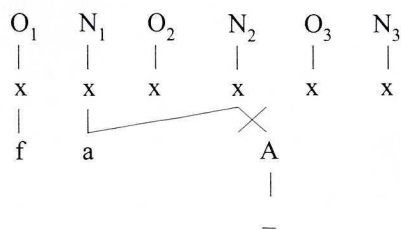

c. [faə]   d. [fɑː]

A comment concerning the representations under (2) is in order here. In (2a) the trill *r* undergoes weakening (reduction) before the empty nucleus N_3 and starts to be

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[10] See Cyran (2003), Scheer (2004) and Kijak (2008).

pronounced with the glide [ə]. Note that the spreading of a consonant to the preceding nuclear position is a typical reaction of sonorants to the weak positions they happen to occur in. This can be observed in, for instance, the formation of syllabic consonants[11]. Furthermore, the historical innovation concerning the lengthening of short vowels before *r* consists in allocating the skeletal slot for the schwa. In other words, what we are faced with here is simply the addition of the Onset-Nucleus (O-N) sequence (the arrow above the O_2-N_2 sequence in (2a)[12]. The latter restructuring creates new possibilities. Thus, the nuclear position N_2 integrates the whole elemental make-up of the following *r* and the latter is delinked (2c). In a different scenario the glide gets delinked and the preceding vowel is lengthened with or without the loss of *r* as in (2d) and (2b) respectively. The lengthenings of high and mid vowels before *r* are offered identical explanation. Note that in the latter case the lengthening is accompanied with vowel lowering and centering. This is a welcome result as in our representation both *r* and the schwa contain the low element (A) which may spread to the left and merge with the original vocalic material (see 3 and 4 below).

The situation is slightly different in the case of long vowels before *r*. Recall that in this context we can observe the loss of tension and diphthongization, hence, [iː/uː] + *r* > [ɪə/ʊə]. It means that there is no restructuring in the form of O-N sequence addition. Instead, the glide is attached to the preceding nuclear position previously occupied by the right branch of the long vowel (3).

3. *beer* [biːr] > [bɪə]

a.

b.
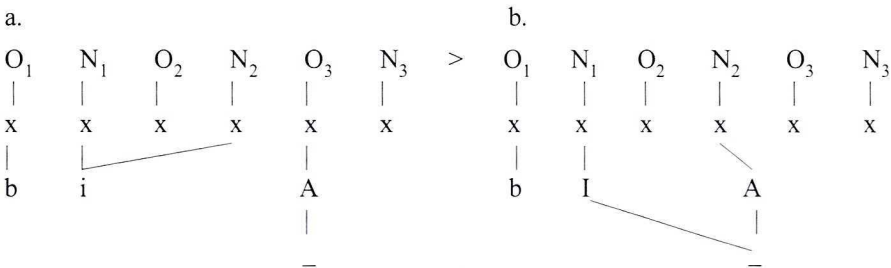
In (3) the long vowel [iː] is shortened because of the incoming glide which docks on to N_2 and it is laxed in the vicinity of the empty element (_), i.e. [iː] (I̲) > [ɪ] (I._)[13]. The form [bɪər] which might have been in use for some time in the past and which is found in contemporary rhotic dialects, is identical to the one represented under (3b) with the difference that in the latter dialects the final *r* has never been delinked from the original position O_3. Finally, the vowel lowering effect produced by the following *r* is best illustrated on the example of the developmental path found in *sure, pure*. Thus both

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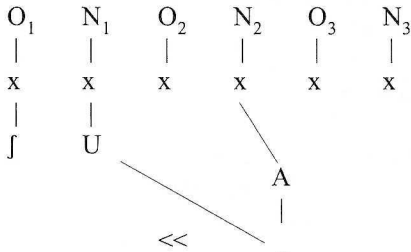[11] See Scheer (2004) and Kijak (2008).

[12] In the Strict CV model the smallest unit that can be manipulated is the Onset followed by the Nucleus. Shortly put, there is no Onset without the following Nucleus and vice versa.
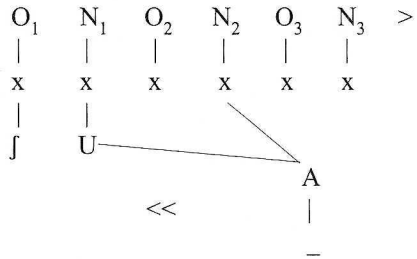
[13] See section 3.2 above.

forms covered a long distance from [ʃʊə]/[pjʊə] via [ʃɔə]/[pjɔə] to [ʃɔː]/[pjɔː] (4). The earlier forms [ʃʊə] – [ʃɔə], as alternative realizations of the standard [ʃɔː], can still be found in some non-rhotic dialects.
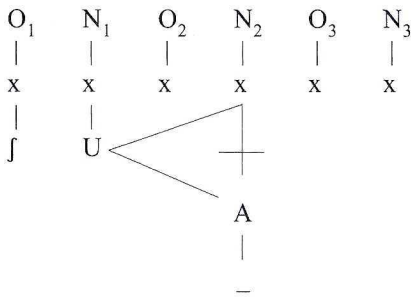
(4)

a. [ʃʊə]

$$
\begin{array}{cccccc}
O_1 & N_1 & O_2 & N_2 & O_3 & N_3 \\
| & | & | & | & | & | \\
x & x & x & x & x & x \\
| & | & & & & \\
\int & U & & & & \\
\end{array}
$$

$\quad$ A

$\quad$ << $\quad$ |

$\quad$ –

$\quad$ >

b. [ʃɔə]

$$
\begin{array}{cccccc}
O_1 & N_1 & O_2 & N_2 & O_3 & N_3 \\
| & | & | & | & | & | \\
x & x & x & x & x & x \\
| & | & & & & \\
\int & U\text{—} & & & & \\
\end{array}
$$

$\quad$ A

$\quad$ << $\quad$ |

$\quad$ –

$\quad$ >

c. [ʃɔː]

$$
\begin{array}{cccccc}
O_1 & N_1 & O_2 & N_2 & O_3 & N_3 \\
| & | & | & | & | & | \\
x & x & x & x & x & x \\
| & | & & & & \\
\int & U & & & & \\
\end{array}
$$

A
|
–

In (4a) the empty element (_) is doubly linked to N_1 and N_2. In N_1 it forms [ʊ] together with the element (U) and in N_2 the glide [ə] with the element (A). Note that the material under N_2 comes from the previously weakened (defused) *r* originally attached to O_3. The form in (4b) represents a situation where both elements, i.e. (A._), being attached to N_2 spread to the left and merge with the vowel in N_1 resulting in [ɔə]. And finally, in (4c) we have a situation where the whole material is merged with the vowel under N_1 giving rise to a complex structure, i.e. (U.A._) = [ɔː] attached to two skeletal slots. It should be stressed here that the material from the schwa (and originally from *r*) survives in the elemental make-up of the root vowel.

$\qquad$ To sum up, in this section we proposed a solution to developments of historical *r*-full forms. All the changes that took place in such forms can be captured in a uniform way, i.e. they were triggered by the weakening of *r* in the prosodically weak positions with some later repercussions in the form of different vocalic reflexes. Additionally, this account allows for a direct link between the process and the context. The general conclusion emerging from the analysis is that sonorants are not safe in prosodically weak positions. In a situation when licensed by the empty nucleus they spread to neighbouring positions to escape negative consequences (e.g. deletion). This single
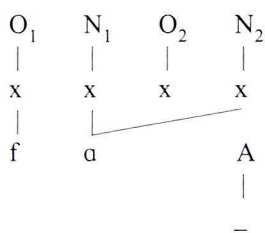
observation can explain various phenomena, e.g. the vocalization of *j*, *w* and *r* in the word-final and pre-consonantal position, the formation of syllabic consonants or partial geminates, among others. Moreover, the solution proposed here can help us explain two widespread phenomena appearing in non-rhotic dialects, i.e. *r*-zero alternations in etymologically *r*-full forms (linking *r*) and *r*-less forms (intrusive *r*).
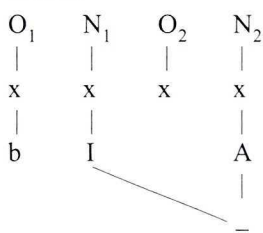
5. *r*-zero alternations

In the previous section we have analysed the historical development of *r*-full forms. We have argued that the elemental make-up of the weakened *r*, i.e. (A._), was transported to the preceding nuclear position with a partial (4a) or total (4b) merger with the root vowel. In a different scenario the root vowel (usually a lower one) spread to the nuclear position occupied by the material from the previously defused *r*, i.e. [ə]. In consequence the schwa got delinked and the root vowel lengthened (2d) and also (4c). Crucially, we have stressed the fact that the elemental make-up of the historical *r* is still present in one way or another in the lexical representation of the etymologically *r*-full forms (5).
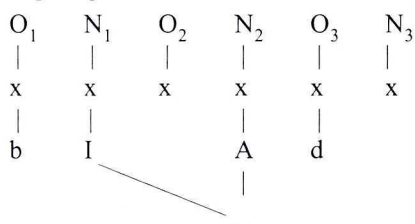
5.

a. [fɑː]

$$O_1 \quad N_1 \quad O_2 \quad N_2$$
$$| \quad\quad | \quad\quad | \quad\quad |$$
$$x \quad\quad x \quad\quad x \quad\quad x$$
$$| \quad\quad \quad \quad \quad$$
$$f \quad\quad ɑ \quad\quad\quad\quad A$$
$$\quad\quad\quad\quad\quad\quad\quad\quad |$$
$$\quad\quad\quad\quad\quad\quad\quad\quad -$$

b. [bɪə]

$$O_1 \quad N_1 \quad O_2 \quad N_2$$
$$| \quad\quad | \quad\quad | \quad\quad |$$
$$x \quad\quad x \quad\quad x \quad\quad x$$
$$| \quad\quad | \quad\quad | \quad\quad |$$
$$b \quad\quad I \quad\quad\quad\quad A$$
$$\quad\quad\quad\quad\quad\quad\quad\quad |$$
$$\quad\quad\quad\quad\quad\quad\quad\quad -$$

c. [bɪəd]

$$O_1 \quad N_1 \quad O_2 \quad N_2 \quad O_3 \quad N_3$$
$$| \quad\quad | \quad\quad | \quad\quad | \quad\quad | \quad\quad |$$
$$x \quad\quad x \quad\quad x \quad\quad x \quad\quad x \quad\quad x$$
$$| \quad\quad | \quad\quad\quad\quad | \quad\quad |$$
$$b \quad\quad I \quad\quad\quad\quad A \quad\quad d$$
$$\quad\quad\quad\quad\quad\quad\quad\quad |$$
$$\quad\quad\quad\quad\quad\quad\quad\quad -$$

In (5a) the schwa (from historical *r*) is not linked to the skeletal slot and hence not pronounced but still lexically present. In (5b) and (5c) the material from the historical *r* is attached to the skeleton and surfaces in the clothes of schwa [ə][14]. It should be

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[14] Note that from the historical viewpoint the skeleton underwent further restructuring and some O-N sequences as not used were lost. Compare the representations from the previous section

borne in mind that although the examples discussed so far cover the stressed vowels before r only, the forms in which r disappeared after the unstressed vowel are given identical explanation. What is interesting, however, is that under certain conditions the forms in (5a) and (5b), unlike the one in (5c), have r-full variants. To put it differently, the loss of r in the pre-consonantal position is stable, it never alternates with zero in this position. The alternating r variant, recall from 2 above, occurs whenever the following word/suffix begins with a vowel. The situation is explained as the spreading of the material from the schwa (previous r) to the empty onset position of the following word. As mentioned above, in this theory the smallest unit that can be manipulated is an O-N sequence. It simply means that a vowel initial word begins with the empty onset which can be used as a docking slot for the preceding r, i.e. (A._), to anchor in. This situation is illustrated in (6) below.

6.

a. car is [kɑːr ɪz]

$$O_1 \quad N_1 \quad O_2 \quad N_2 \qquad\qquad O_1 \quad N_1 \quad O_2 \quad N_2$$
$$| \qquad | \qquad | \qquad | \qquad\qquad\quad | \qquad | \qquad | \qquad |$$
$$x \qquad x \qquad x \qquad x \qquad\qquad x \qquad x \qquad x \qquad x$$
$$| \qquad \llcorner\!\!\longrightarrow \qquad\qquad\qquad\qquad | \qquad |$$
$$k \qquad ɑ \qquad\quad A \qquad\qquad\qquad\qquad ɪ \qquad z$$
$$\qquad\qquad\qquad\quad |$$
$$\qquad\qquad\qquad\quad -$$

b. [dɛərɪŋ][15]

$$O_1 \quad N_1 \quad O_2 \quad N_2 \qquad\qquad O_1 \quad N_1 \quad O_2 \quad N_2$$
$$| \qquad | \qquad | \qquad | \qquad\qquad\quad | \qquad | \qquad | \qquad |$$
$$x \qquad x \qquad x \qquad x \qquad + \qquad x \qquad x \qquad x \qquad x$$
$$| \qquad | \qquad \llcorner\!\!\longrightarrow \qquad\qquad | \qquad |$$
$$d \qquad ɛ \qquad\quad A \qquad\qquad\qquad\qquad ɪ \qquad ŋ$$
$$\qquad\qquad\qquad\quad |$$
$$\qquad\qquad\qquad\quad -$$
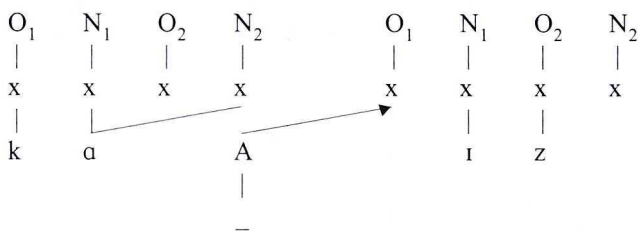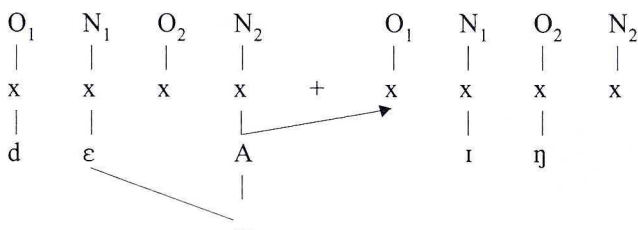
The spreading occurs whenever the onset is made available for the defused r. This is possible in this context because the onset position is licensed by the following full vowel. Recall from the previous section that the major reason why r weakened and subsequently moved to the left was the inconvenient weak position, i.e. before the empty nucleus. What we claim here is that in forms like [kɑː] (6a), r has been phonetically lost but is still present in the lexical representation as a dangling (A._) expres-

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with those given here. This problem, as not relevant to the present analysis, is not pursued any further here.

[15] The representation of the suffix -*ing*, as not crucial to our analysis, has been simplified here.

sion[16]. In (6b), on the other hand, the elements from the weakened *r* have been both merged with the root vowel and attached to the nuclear position giving rise to diphthongs. As lexically present, the elements (A._) are free to spread to the onset position whenever the conditions are satisfied. Note that when the following word starts with a consonant the elements (A._) do not have a chance to dock on to the onset position as the latter is occupied by a consonant (7).

7. *car for* [kɑː fə]

$$O_1 \quad N_1 \quad O_2 \quad N_2 \qquad O_1 \quad N_1$$
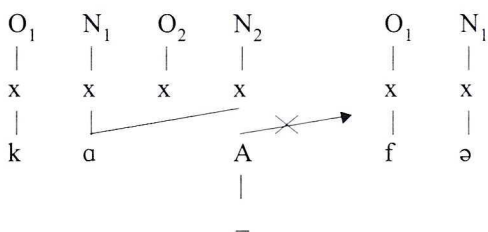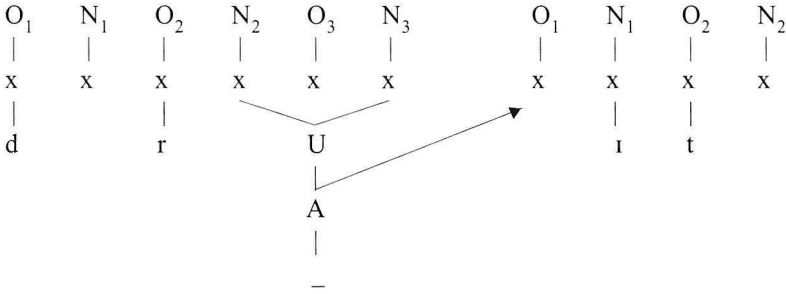

Apart from the linking *r* discussed above, some speakers, mainly of non-rhotic dialects, have yet another type of the *r*-zero alternation, the so-called intrusive *r*. This alternation boils down to the realization of *r* in the etymologically *r*-less forms. The *r* variant, similarly to linking *r*, occurs before a vowel-initial morpheme. The only difference between both phenomena is that intrusive *r* arises only after non-high vowels, e.g. *law and* [lɔːr ənd], *drawing* [drɔːrɪŋ], *sofa of* [səʊfər əv], etc. It would be rather difficult to prove the presence of *r* in the lexical representation of historically *r*-less forms[17]. Therefore, what we claim here is that intrusive *r* is a separate process and not any broadened version of the linking type, which consists in the spreading of (A._) from a non-high vowel including schwa[18]. Note that in the Element Theory applied in this analysis all non-high vowels contain the low element (A), this is also true for the schwa which is defined here as (A._). This solution seems superior to others in that it can do without a somewhat awkward idea of the lexical *r* in etymologically *r*-less forms. Moreover, it can explain, in a non-arbitrary way, the fact that only non-high vowels participate in this type of *r*-zero alternation[19]. The representation of the intrusive *r* in action is given in (8) below.

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[16] Cf. Harris (1994) and Gussmann (2002).

[17] Cf. Harris (1994: 249) who argues for this very solution. In his analysis both linking and intrusive *r* are examples of a floating segment.

[18] Harris (1994: 253) points out that, although much rarer, intrusive *r* occurs also in rhotic dialects and may have appeared as early as the *r* loss itself. These two observations confirm the independence of the former phenomenon from the linking *r*.

[19] Cf. Broadbent (1991).

8. *draw it* [drɔːr ɪt]

O₁   N₁   O₂   N₂   O₃   N₃   O₁   N₁   O₂   N₂
| | | | | | | | | |
x   x   x   x   x   x   x   x   x   x
| | | | | |
d   r   U   ɪ   t
                  |
                  A
                  |
                  —

Summing up, both linking and intrusive *r* contain the elemental make-up needed for *r*-zero alternation to operate. What differs, however, is the source of this material. It is either a historical remnant from the weakened *r* (linking type) or it has always been there as the part of a non-high vowel (intrusive type). The latter is interpreted as a separate process available to native speakers of both rhotic and non-rhotic dialects.

6. Conclusions

In this paper we have argued that the first step in the historical developments of *r*-full forms, i.e. *r* weakening, was a reaction to positional plight (before the empty nucleus). The weakened *r*, in order to avoid negative consequences, migrated to the left and invaded the preceding nuclear position ([ə] development), merged with the preceding vowel or both. These changes gave rise to various vocalic reflexes found in many different dialects. It has been shown that historical *r* has never been lost from the lexical representation of etymologically *r*-full forms. Quite the opposite, it has been existing in many different ways ready to surface whenever the conditions are satisfied. This can be observed in the sandhi phenomenon called linking *r*. On the other hand, intrusive *r* has been analysed as a separate (but still similar) process in which a part of the elemental make-up of non-high vowels spreads and surfaces under the onset position of the following morpheme.

Apart from linking and intrusive *r*, the solution proposed here can explain various vocalic reflexes found in the context of historical *r* in many different dialects, both rhotic and non-rhotic.

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