H[aɪɛɪ]tus?

Makoto Umeno

Abstract Some long vowels in English behave differently from other vowels in that they allow another vowel to follow immediately. On the face of it, hiatus, which is a widely disfavoured phenomenon, appears to manifest itself after those vowels. However, reviewing the literature and examining their phonological status reveal that those long vowels indeed produce a hiatus-breaking glide, [j] or [w], after them when followed by another vowel. This glide-forming process takes place not only across morpheme and word boundaries but also within a morpheme. Accounting for the mechanism of this process requires explicit reference to empty constituents and monovalent subsegmental primes.

1. Introduction

Hiatus, an occurrence of consecutive vowels that belong to different syllables without the intervention of any consonant, is a cross-linguistically disfavoured phenomenon. In many languages, it is usually resolved by any of the three phonological processes: deleting one of the vowels, synthesising them, or adding a consonant. When it comes to the English language, however, it is not clearly stated in the literature whether English avoids hiatus or not, and this ambiguity may be mainly due to the phonemic/phonetic transcription of English.

While checked vowels in English are not followed by another vowel (thus they never provide the environment where a hiatus occurs), diphthongs and certain long monophthongs, /iː, eɪ, aɪ, ɔɪ, uː, oʊ(əʊ), aʊ/, appear to be able to be followed by another vowel. For example, "*buying*" is transcribed as /ˈbaɪ.ɪŋ/, which seems to allow a vowel sequence /ɪ.ɪ/ to occur. This sort of vowel sequence, however, could be attributed to the transcriptional system itself.

It is also notable that there have been a lot of phonologists who have given symbols *y*, *w* or *j*, *w* to the second part of diphthongs (and sometimes long monophthongs that end with [+high]), as in /iy, ey, ay, ɔy, uw, ow(əw), aw/. Although these symbols are quite insightful in some kind, they may also create the uncanny conception that these vowels end with a consonant. Lindsey (2019), at the extreme of this transcriptional faction, argues that diphthongs of the Standard Sothern British pronunciation (henceforth SSB) should be represented as /ɪj, ɛj, ɑj, oj,

ʉw, əw, aw/[1]. As he argues, this treatment of long vowels is supported by a number of phonetic and phonological facts.

Unfortunately, the two viewpoints above do not provide any clues to the interpretation of the actual phonological status of those vowels and just raise two questions: do those vowels really allow a hiatus to occur? And is the second part of diphthongs and some monophthongs a consonant? The first part of this paper is mainly concerned with tackling the latter question and describing the phonological characteristics of the long vowels in question. The second part will propose that English does not allow hiatus to occur across any boundaries, such as syllables, morphemes, and words through a hiatus-breaking process, namely glide formation.

§2 shows how English long vowels can be phonologically categorised and offers reasons for rejecting the view that diphthongs and certain monophthongs end with consonants by scrutinising their phonological characteristics. §3 introduces the notion and mechanism of empty constituents in the Government Phonological literature. §4 reviews the literature that accounts for a hiatus-breaking process by introducing Element Theory and an empty onset and then extends this analysis (with some modifications to it) to the explanation for a glide-forming process taking place within a morpheme in English by assuming that every syllable has an onset position irrespective of whether it is filled with melodic content. This section also takes up some other hiatus-breaking processes. §5 summarises the main conclusions.

2. Long vowels in English

2.1 The classification of long vowels

Long vowels in English are traditionally divided into two groups: monophthongs[2] and diphthongs as in (1). Diphthongs can be further classified into two subgroups: closing diphthongs and centring diphthongs.

(1)

MONOPHTHONGS			(closing) DIPHTHONGS			(centring)	
iː		uː				ɪə	ʊə
	ɜː	ɔː	eɪ	əʊ	ɔɪ	eə	
		ɑː		aɪ aʊ			

[1] On the quality of the first part of these long vowels (diphthongs), see Lindsey (2019).

[2] Gimson (1980) named the relevant vowels as ‘pure vowels’ because they exhibited no quality change in their first half and second half. Lindsey (2019) states that this was actually so at the time Gimson gave the explanation, but nowadays, vowels /iː/ and /uː/ show a more diphthongal-gliding nature.

As Gimson (1980) acknowledges, this classification is problematic from a phonological point of view, but this is still a widely held view of an English vowel system.

Wells (1982) revised this analysis and proposed a new categorisation of English long vowels as in (2). The leftmost group consists of traditional monophthongs and diphthongs which have a front mid to close quality in their endpoints, and the central group is made up of traditional monophthongs and diphthongs which have a back mid to close quality in their endpoints. The rightmost group comprises those of traditional monophthongs and diphthongs which have relatively open quality (in binary feature term: [-high]) in their endpoints. Unlike Gimson's categorisation, Wells' is strongly motivated by phonological characteristics that these vowels have: while the vowels in the leftmost and centre groups end in [+high] quality and permit another vowel to follow, those in the rightmost group end in [-high] quality and usually cause *linking-r* or *intrusive-r* when followed by another vowel.

(2)

iː				uː	ɪə			ʊə
eɪ		ɔɪ	əʊ		ɛə	ɜː		ɔː
	aɪ		aʊ			ɑː		

Lindsey (2019) develops the analysis given by Wells and argues that the seven vowels form a natural class because they not only undergo processes, such as smoothing and pre-fortis clipping, but can be followed immediately by another vowel without the process known as *linking-r* (or *intrusive-r*). Lindsey gives the classification[3] as the following:

(3)

ɪj				ʉw	ɪː			ɵː
ɛj		oj	əw		ɛː	ɜː		ɔː
	ɑj		aw			ɑː		

What is noteworthy in (3) is that the seven vowels from the left have glides /j/ and /w/ as their endpoint and the six vowels on the right column are transcribed as monophthongs. This characterisation suggests that vowels that end with [+high] nature, regardless of whether they

[3] It is notable that the qualities of the first part of these diphthongs are considerably different from those in (1) and (2). This reflects vowel quality changes taking place in the southern part of England these days, which are phonetically motivated. See Lindsey (2019) and Fabricius (2019) for a more detailed description.

were previously treated as monophthongs or closing diphthongs, are diphthongs and those which end with [-high] nature, regardless of whether they were previously treated as centring diphthongs or pure monophthongs, are monophthongs. Hereafter, we call the seven vowels from the left in (3), which have conventionally been transcribed as /iː, eɪ, aɪ, ɔɪ, uː, əʊ(oʊ), aʊ/, as just 'diphthongs'.

This transcription raises a quite fundamental question as to whether the second part of those seven diphthongs is a consonant or not. Given the phonological status of those diphthongs noted above, it seems uncontroversial to assume that the second half of them is a consonant, /j/ or /w/. In the next subsection, we will consider the validity of this view and then demonstrate that it is better not to regard the second part of the diphthongs as a consonant.

2.2 A vowel or a consonant?

2.2.1 Introduction: phonetic viewpoint

On the face of it, as noted earlier, the second part of the diphthongs, /j/ and /w/, can be considered as a consonant, and if so, those diphthongs should be regarded as just the combination of a vowel plus a consonant.

It may be quite difficult to discern whether the second half of the diphthongs is a vowel or a consonant from the phonetic point of view since high vowels [i] and [u] and glides [j] and [w], respectively, have almost the same amount of degree of stricture in the oral cavity (cf. Giegerich 1992, McMahon 2001), though some scholars claim that their dynamics or constriction degrees are different (The former view is held by Catford (2001), and the latter is by Ladefoged & Maddieson (1996), Padgett (2008))[4]. Moreover, as Cruttenden (2014) argues, each second part of those diphthongs shows a different degree of narrowing of the oral cavity individually depending on the quality of its preceding part; that is, /j/ of /ɪj/ and /j/ of /ɑj/, for instance, have the different extent of stricture.

Under the phonetic account of the diphthongal offglides, therefore, it is still not clear whether they are consonants or not. This insufficiency of explanation for their real status requires us to investigate the issue from an alternative perspective: phonology. Below we will show how close the relationship between the first and second parts of the diphthongs is and the empirical reasons why they should not be treated as a vowel plus consonant sequence.

2.2.2 Distributional discrepancy

It may be tempting to assume that diphthongal offglides /j/ and /w/ are consonants if we

[4] The accounts given by the literature listed here are based rather on languages around the world than on English.

pursue the symmetric distribution of consonants flanking a vowel (i.e. an onset and a coda). Conventionally, glides in English have been considered to manifest themselves only in the onset position, but the assumption allows them to occur on either side of a vowel; hence they not only can occupy an onset position but also a coda position. This means that they show exactly the same distributional manner as other consonants, such as /t/ (***taught***), /p/ (***pop***), /k/ (***kick***), etc. Couched in this term, however, the close relationship between the first and second parts of the diphthongs cannot be accounted for.

Firstly, if we assume that the second part of the diphthongs is a consonant, we should treat each set of diphthongs as V̆+/j/ and V̆+/w/ (V̆ refers to a stressed short lax vowel, also known as a checked vowel). Compared to V̆+/other consonants/, which usually displays a maximal inventory of five canonical vowels plus /ʌ/[5] (e.g. (4a)), their vowel inventories are reduced as depicted in (4b) and (4c). Here, '◯' in (4b) and (4c) indicates that the corresponding vowel that exists in a full vowel inventory does not exist.

(4) a. V̆+/t/

		ɪ				ʊ		
	ɛ		ʌ		ɔ			
			a					
pit						put		
pet			putt			pot		
			pat					

b. V̆+/j/

		ɪ				◯		
	ɛ		◯		ɔ			
			a					
pea						---		
pay			---			toy		
			pie					

c. V̆+/w/

		◯				ʊ		
	◯		◯		ɔ			
			a					
---								two
---			---					toe
			cow					

In modern English, there are no combinations of vowels that constitute a diphthong, such as /ʌ/+/j/ (=*ʌɪ) or /ʊ/+/j/ (=*ʊɪ) as in (4b), and /ɪ/+/w/ (=*ɪʊ), /ɛ/+/w/ (=*ɛʊ), or /ʌ/+/w/ (=*ʌʊ) as in (4c). It would be possible to think of diphthongs /aɪ/ and /aʊ/, as /ʌ+j/ and /ʌ+w/, not /a+j/ and /a+w/, but this sort of analysis is not directly relevant here in the fabric of arguments displaying the difference of the distributional degree of vowels between a V̆ plus glide sequence and a V̆ plus non-glide consonant sequence.

Secondly, if the second half of the diphthongs were a consonant, it would allow not only short vowels but also long vowels to precede, just as other consonants[6]. For example, both long and short vowels can occur before a word-final /t/, such as /biːt/ *beat vs*. /bɪt/ *bit* and /fuːl/ *fool*

[5] Most dialects of English have 6 checked vowels and they consist of five canonical vowels plus /ʌ/ (cf. Trager & Smith 1951, Giegerich 1992, Honeybone 2010). The majority of dialects of northern England, however, lack /ʌ/ in their vowel inventories; that is, they just have 5 checked vowels in a stressed syllable.

[6] /ŋ/ does not allow any long vowels to precede.

vs. /fʊl/ *full*. However, long vowels do not occur before glides in monosyllabic words; and there are no sequences, such as *[iːj], *[iːw], *[uːj], *[uːw], etc ([ɪj] and [ʊw] can be thought of as /iː/ and /uː/, respectively).

These two facts strongly support the argument that a vowel and its following glide are strictly intertwined and should not be treated as a separate vowel plus consonant sequence. If they were regarded as separate segments, the reason why the vowel before a glide holds distributional restrictions could not be accounted for. The next subsection will offer further support for the argument by taking up two dynamic processes, both alternations.

2.2.1 Alternations

When diphthongs in English undergo alternations, their first and second parts alternate as one unit. Their unitary characteristic manifests itself in closed-syllable shortening, which is an alternation between long and short vowels, as in (5). The condition under which short vowels occur is when the vowel and the following consonant occupy the same syllable within a word (cf. Myers 1987, Harris 1994, Harris & Gussmann 2002).

(5)

DOMAIN-FINAL	DOMAIN-INTERNAL
perceive	perceptive
describe	descriptive
reduce	reduction
five	fifty
retain	retentive

Long vowels in English are free to occur before a word-final consonant, namely, a coda. Harris (1994) argues that this word-final consonant constitutes an onset position of the following empty nucleus, thus it does not occupy the same syllable with its preceding nucleus (as we will see in §3.2). On the other hand, the lefthand position of the domain-internal consonant clusters in the right column, such as perce[p]tive or redu[k]tion, has no choice but to occupy a coda position because there are no onset clusters like [pt], [kt], [ft] or [nt] in English; the outcome is the shortening of its preceding vowel. What is important here is again that diphthongs alternate as one set.

A similar phenomenon is observed in another vowel alternation, called trisyllabic laxing[7], in which long vowels alternate with short in suffixed forms. By taking a closer look at this alteration in (6), again, we can find the first and second parts of diphthongs undergo the process

[7] Harris (1994) argues that trisyllabic laxing accompanying vowel shift is not treated in terms of a phonological process, and the alternants of this process are recorded in the lexicon.

as one unit.

(6)

UNSUFFIXED FORMS		SUFFIXED FORMS	
v[eɪ]n	*vain*	v[a]nity	*vanity*
ser[iː]n	*serene*	ser[ɛ]nity	*serenity*
div[aɪ]n	*divine*	div[ɪ]nity	*divinity*
pron[aʊ]nce	*pronounce*	pron[ʌ]nciation	*pronunciation*
s[oʊ]le	*sole*	s[ɔ]litude	*solitude*

The fact shown in these different alternation processes provides further confirmation that the diphthongs are composed of closely related two parts and behave as one unit through any phonological processes.

To summarise the discussion so far, the second part of diphthongs exhibits both consonantal and vocalic nature, but it is best analysed as a vowel, not a consonant, due to the fact that it has an intimate connection with its first part as seen in both static distributional patterns and dynamic alternations. There remains, nevertheless, a fundamental question of why the second part of diphthongs also displays a distinctive (not vowel-like) characteristic of being able to be followed by another vowel immediately, even though it is not a consonant but a vowel. This question in turn brings us back to the most important question raised in §1: do those vowels really allow a hiatus to occur? Shortly, We will offer direct insight into these two questions by implementing the notion of the empty category in conjunction with Element Theory. Before proceeding to the argument, it is necessary to introduce some basic concepts of the empty category in phonology.

3. Empty constituents

3.1 Introduction

The following subsections are a brief description of empty constituents that are well established in the framework of Government Phonology (GP hereafter). The notion of 'empty' positions has a parallel with empty categories in syntax. §3.2 and §3.3 will explain empty nuclei and empty onsets, respectively.

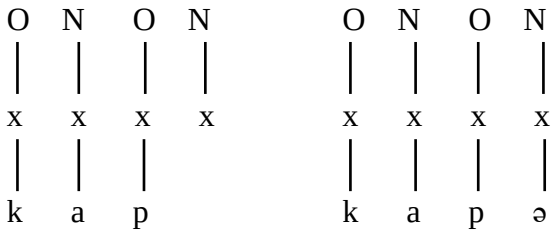
3.2 Empty nuclei

Empty nuclei can occur in almost any place: word-initially, word-internallyand word-finally. Note that word-internal empty nuclei can be divided into two types: one which is properly governed (Kaye 1990) and another which is sandwiched between flanking onsets (Gussmann & Kaye 1993). Here we only take up a word-final empty nucleus because others

are not a central concern in this paper.

A consonant occurring word-finally is widely acknowledged as a 'coda', but most phonologists in the GP framework consider a word-final consonant as an onset which is followed by an empty nucleus. This means that there must always be a nucleus regardless of its phonetic realisation: empty or not. Kaye (1990) states that the parametric setting for a language determines whether the language allows the word-final consonant to occur; that is, languages that have consonants in a word-final coda position permit domain-final empty nuclei, but in languages where all words end with vowels, final nuclei must be filled with melodic contents and phonetically realised. While English, for example, belongs to the former group and thus licenses a domain-final empty nucleus, Italian which is a member of the latter does not license a domain-final empty nucleus. The configurations of the domain-final empty nucleus and filled one are illustrated in (7a) and (7b), respectively.

(1) a. cap [capØ] b. kappa [kapə]



3.3 Empty onsets

Empty onsets have not been a central issue as much as empty nuclei in the GP literature, and there are no particular licensing principles or parametric settings concerning empty onsets; they are just prosodically licensed by the following nucleus on the inter-constituent projection. Thus, it is not even clear whether an empty onset always exists before a nucleus when the onset position is not filled with melodic contents (we will return to this question presently). However, this state of affairs does not mean that empty onsets do not play a pivotal role in phonological processes. There are, indeed, good grounds for discussing their status in detail.

Clements & Keyser (1983) introduced the notion of empty onsets in the treatment of a phenomenon called *h-aspiré*, which is observed in French, but strictly speaking, this analysis was not done in the GP framework. Charette (1991) addressed this unique phonological phenomenon with this notion in the authentic GP framework. Harris (1994) also resorts to it to analyse English phonological processes such as *linking-r*, *intrusive-rand* glide formation (as we will see shortly in §4). In this way, the idea that an empty onset exists where no melodic content occupies an onset position has been exploited in the literature.

4. A hiatus resolution: empty onsets and glide formation in English

4.1 An element-based view

Recall that diphthongs in English, which are traditionally transcribed as /iː, eɪ, aɪ, ɔɪ, uː, əʊ(oʊ), aʊ/, allow another vowel to follow immediately, but neither other long vowels nor checked vowels are followed by another vowel without an intervening consonant. According to this characteristic of diphthongs, we can postulate that their ending point is a consonantal glide, but we should regard it as vocalic (just as the second part of a diphthong) not consonantal due to the facts we discussed in §2.2. The question, then, is this: why do only diphthongs behave like this? As noted in §2.1, all diphthongs share the [+high] feature in their endpoint. However, this fact only suggests that they form a natural class but offers little or no insight into the question.

We can elegantly deal with this issue by assuming that the subsegmental status of a phonological prime is monovalent (or privative), so the phonological contrast is viewed as specifications like [PRIME] vs. zero. In the GP framework, a monovalent subsegmental prime is called an 'element' and the theory concerning it is referred to as Element Theory. The traditional binary feature system does not account for the striking similarity of glides and corresponding high vowels (as seen in §2.2.1). The explanation for their commonality, on the other hand, can be achieved within the privative model of segmental structure since this model assumes that glides and corresponding high vowels share the same primes [I] and [U][8]. In this approach, they are segmentally identical but differ in their syllabic affiliation: high vowels at a syllable nucleus and glides at syllable margins (such as an onset) (Kaye & Lowenstamm 1984, Harris & Lindsey 1995). In terms of this privative approach, the second part of diphthongs has [I] or [U], and these elements are considered to be the cause of the unique behaviour of diphthongs.

4.2 *Harris's view*

Harris (1994: 104) presents the analysis of the creation of a hiatus-breaking glide across a word boundary. According to his analysis, glide formation occurs after a certain class of vowels, which are 'diphthongs' we call in this paper. The examples are as follows:

---

[8] One might think that two elements, [I] and [U], do not account for the reason why they behave in a unified fashion in a number of phonological processes. This was well captured by a traditional bivalent approach as they share the feature [+high]. Kaye, Lowenstamm & Vergnaud (1985) try to capture this nature by proposing that languages that have a canonical 5-vowel system collapse [I] and [U] tiers into one unified [I/U]-tier.

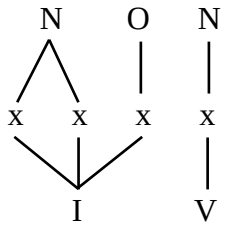
(8) Harris (1994: 104)

a.	i:V → i:yV	three [y] and
	u:V → u:wV	two [w] of
b.	eyV → eyyV	day [y] of
	owV → owwV	go [w] of
c.	*Shah [y] of, *Shah [w] of	

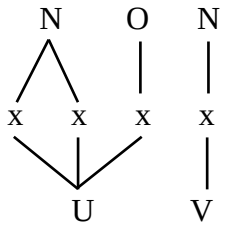
Harris explains that which type of glide occurs is determined by the nature of the preceding vowel, and this process can be explained as the spreading of an element from the nucleus to the empty onset, illustrated in (9). Note that he also writes that a skeletal slot is automatically created in the onset to accommodate the relevant element.

(9) Harris (1994: 104)

a. i:V → i:yV



b. u:V → u:wV



There are two issues we should concern here in this analysis. Firstly, two representations in (9) are illustrated as if the second nucleus were the head of nuclei, but this is inconsistent with the generalisation that the first slot of nuclei is always the head in English. If we follow this generalisation, however, the element lexically residing on the first nucleus spreads into the second and further into the vacant onset position; but this also seems to contravene the notion of STRICT LOCALITY. Secondly, this glide-forming process does occur not only across a word boundary but also across a morpheme boundary and within a morpheme (we will take these up in the next subsection).

4.3 Glide formation within a morpheme

It is notable that Harris (1994) provides little or no explanation for glide formation in other environments than a word boundary. Backley (2011) extends the view presented by Harris as depicted in (8) and (9) to the analysis of the glide-forming process manifesting itself inter-morphemically. It may be easy to imagine the inter-morphemic case because the process occurring in the context is almost the same as that occurring across a word boundary; for example, a morpheme without an onset generates a skeletal slot in the onset when following

another morpheme that lacks a domain final consonant. But what about glide formation taking place in an intra-morpheme? Consider the examples of intra-morphemic vowel sequences below:

(10)

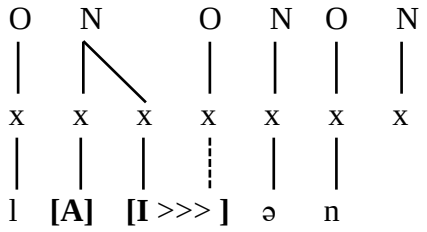
iːɔn	*aeon*
keɪɔs	*chaos*
vɔɪɪʤ	*voyage*
laɪən	*lion*
fuːəl	*fuel*
pəʊɪt	*poet*
vaʊəl	*vowel*

Although one might think at first blush that these words are allowing a hiatus to occur just as transcriptions in the left column of (10), it is obvious that vowels in the first syllable of these words are indeed the 'diphthongs', and no other types of vowels can be immediately followed by another vowel in a morpheme (Lindsey 2019). This salient fact suggests that the same glide-forming process as in (9) takes place intra-morphemically. Should we then assume that an empty skeletal slot in the onset is automatically created to accommodate an element that comes from its preceding vowel in this case as well? It would be so in terms of Harris's account, but the appearance of a new onset position violates the STRUCTURE PRESERVATION PRINCIPLE stated as follows (especially in the intra-morpheme case):

(11) STRUCTURE PRESERVATION PRINCIPLE (Harris 1994: 190)
Licensing conditions holding of lexical representations also hold of derived representations.

If the glide-forming process in a monomorphemic word occurs cyclically, the derived structure differs from the lexical one since there is an insertion of a new onset position through the process. Thus, it seems natural to assume that there always exists an onset position before a nucleus irrespective of whether the onset position is filled with melodic contents or not; that is every syllable has an onset position. Adopting this assumption, we can explain an intra-morphemic glide-forming process as spreading of elements residing on the second nucleus into the following empty onset position as illustrated in (12) (where >>> denotes spreading).

(12) laɪ[j]ən *lion*



The view that an onset always exists before a nucleus is confirmed by the typological fact that there are no languages in the world that forbid onsets. Every language has an onset irrespective of whether it always requires an onset (e.g. Hua, Senufo, Temiar, etc.) or not (e.g. English, Italian, Japanese, etc.) (Zec 2006). Another fact to note is that an onset position is blind to the computation of syllable weight, so postulating that an onset position is always there does not change traditional phonological approaches to metrical structure.

In order to develop the idea that hiatus-breaking glide results from spreading of the relevant elements, [I] or [U], which reside on the preceding vowel, it is necessary to say something about the relationship between the structural status of long vowels (of course including diphthongs) and the elements that can be contained in it. As discussed in the previous subsection, the relevant elements in the case of (8a) and (9) must be considered to spread from the first nucleus to the second and then to the vacant onset position, but this violates the condition of STRICT LOCALITY. Thus, this process is best expressed by assuming that elements [I] and [U] are lexically specified in the righthand slot (i.e. the complement position) of a branching nucleus in the case of English 'diphthongs' as illustrated in (13a). When it comes to the analysis of English vowels, /iː/ and /uː/, the complement slot of a branching nucleus has generally been recognised as 'empty' and filled with elements lexically specified in the head position by spreading as given in (13b) (Harris 1994, Backley 2011).

(13) a. b.

If we follow the latter view, however, we will lose sight of the fact that /iː/ and /uː/ phonologically behave exactly the same as true diphthongs, /eɪ, aɪ, ɔɪ, əʊ(oʊ), aʊ/ that are

conventionally regarded as having the (13a) type of structure. Assuming that [I] or [U] is lexically encoded in the complement slot of a branching nucleus in the case of diphthongs enables us to account for the unified fashion of their phonological behaviour and address the issue confronting the condition of STRICT LOCALITY as argued earlier. Then it makes sense to view long monophthongs in non-rhotic varieties, as shown in the rightmost group of (3), as having the (13b) type of structure.

Taking account of the OBLIGATORY CONTOUR PRINCIPLE (OCP) as noted in (14), however, the idea we have developed so far is undesirable in that two identical elements can be lexically adjacent, for instance in (13a). This problem can be handled by reference to the headedness of the relevant elements; while elements in the lefthand (governing) position are headed, those in the righthand (governed) position are lexically non-headed.

(14) OBLIGATORY CONTOUR PRINCIPLE (OCP)[9]
The occurrence of adjacent identical melodic expressions is prohibited.

Moreover, as Harris (1994: 172) acknowledges, a branching nucleus can display a level complexity profile of elements in addition to a downward complexity slope, so it does not matter when the number of elements is the same in both governing and governed positions.

4.4 Other hiatus-breakers

Let us here consider the different types of hiatus-breaking processes other than glide formation. One of the most observed processes is an insertion of a glottal stop, which only occurs across a word boundary. This is accounted for by assuming that an element [ʔ] fills the otherwise vacant onset between the two nuclei. Another well-known process is smoothing, which manifests itself in all environments, such as across syllables ([fɑː] *fi.re*), morphemes ([plɛː] *player*) and sometimes words ([dəːt] *do it*) (Beaken 1971, Wells 1982). Unfortunately, lack of space precludes us from discussing this complicated process in any detail here. *Linking-r* and *intrusive-r* are also hiatus-breaking processes, which occur only across morphemes ([kɛːɹə] *carer*, [dɹɔːɹɪŋ] *drawing*) and words ([kɑːɹɪz] *car is*, [ʃɑːɹəv] *Shah of*) in non-rhotic dialects. Although we cannot provide a detailed account of these two processes due to the limitation of space, it is closely examined in the element-based approach by Harris (1994, 2013) and Backley (2011).

Indeed, there are various ways of hiatus-breaking processes, and any one of these processes is used to avoid hiatus in English. It is not certain how and why a certain process is

[9] The formulation and implementation of the OCP given here is from Harris (1994, 1997).

selected, but these facts clearly indicate that hiatus is disfavoured in any domain (intra- and inter-morpheme and word boundaries) in English.

5. Conclusion

Although some long vowels in English appear to allow another vowel to follow immediately, this does necessarily mean that they allow hiatus, which is cross-linguistically disfavoured, to occur. Taking a closer look at their phonological status, we revealed that they not only form a natural class but also have both vocalic and consonantal natures. Despite the fact that the second part of those vowels exhibits consonant-like characteristics, it is best regarded as a vowel because the first and second parts of those vowels consistently show unified nature through both static distributional facts and dynamic processes of alternations.

The vowels in question should be called 'diphthongs' since their second part is necessarily [+high] in terms of the traditional binary feature or [I/U] in terms of element theory. Harris (1994) argues in an element-based account that elements, [I] and [U], form a glide across a word boundary to avoid hiatus. We extended this view to the explanation of the glide formation manifesting itself intra-morphemically and concluded that there is an onset before a nucleus irrespective of whether the onset position is empty and elements [I] and [U] that lexically reside in the second part of diphthongs spread into the vacant onset to break hiatus. The idea that every syllable has an onset is supported by the facts of both syllable typology and metrical phonology. Significantly, there are also several hiatus-breaking processes in English which were not closely focused on in this paper.

REFERENCES

Backley, Phillip. (2011). *An introduction to element theory*. Edinburgh: Edinburgh University Press.

Beaken, Mike. (1971). A study of phonological development in a primary school population of East London. PhD thesis, University of London.

Catford, John. (2001). *A practical introduction to phonetics*. 2nd edition. Oxford: Oxford University Press.

Charette, Monik. (1991). *Conditions on phonological government*. Cambridge: Cambridge University Press.

Clements, George & Samuel Keyser. (1983). *CV phonology: a generative theory of the syllable*. Cambridge, Mass.: MIT Press.

Fabricius, Anne. (2019). The anticlockwise checked vowel chain shift in modern RP in the

twentieth century: Incrementations and diagonal shifts. In S. Calhoun, P. Escudero, M. Tabain & P. Warren (eds.), *Proceedings of the 19th international congress of phonetic sciences, Melbourne, Australia 2019*. 592-596.

Giegerich, Heinz. (1992). *English phonology: An introduction*. Cambridge University Press.

Gimson, Alfred. (1980). *An introduction to the pronunciation of English.* 3rd edition. London: Edward Arnold.

Gussmann, Edmund & Johnathan Kaye. (1993). Polish notes from a Dubrovnik café. *SOAS working papers in linguistics and phonetics* 3. 427-462.

Cruttenden, Alan. (2014). *Gimson's pronunciation of English,* 8th edition. Routledge.

Harris, John. (1994). *English sound structure*. Oxford: Blackwell.

Harris, John. (1997). Licensing inheritance: An integrated theory of neutralisation. *Phonology* 17. 315–370.

Harris, John. (2013). Wide-domain r-effects in English. *Journal of Linguistics* 49. 329-365.

Harris, John & Edmund Gussmann. (2002). Word-final onsets. *UCL working papers in Linguistics* 14. 1-42.

Harris, John & Geoff Lindsey. (1995). The elements of phonological representation. In Jacques Durand & Francis Katamba (eds.), *Frontiers of phonology*. 34–79. London and New York: Longman.

Honeybone, Patrick. (2010). How symmetrical are English vowels? *Journal of language and language behaviour*, vol. 9. 33-63.

Kaye, Jonathan. (1990). 'Coda' licensing. *Phonology* 7. 301-330.

Kaye, Jonathan & Jean Lowenstamm (1984). De la syllabicité. In François Dell, Daniel Hirst & Jean-Roger Vergnaud (eds.), *Forme sonore du langage*, 123-159. Paris: Hermann.

Kaye, Jonathan, Jean Lowenstamm & Jean-Roger Vergnaud. (1985). The internal structure of phonological elements: A theory of charm and government. *Phonology yearbook* 2. 305-328.

Ladefoged, Peter & Ian Maddieson. (1996). *The sounds of the world's languages*. Cambridge: Blackwell.

Lindsey, Geoff. (2019). *English after RP: Standard British English today*. Palgrave MacMillan.

McMahon, April. (2002). *An introduction to English phonology*. Edinburgh University Press.

Myers, Scott. (1987). Vowel shortening in English. *Natural language & linguistic theory*, vol. 5. 485-518.

Padgett, Jaye. (2008). Glides, vowels, and features. *Lingua* 118. 1937-1955.

Trager, George & Henry Smith. (1951). *An outline of English structure*. Norman.

Wells, John. (1982). *Accents of English.* 3 volumes. Cambridge: Cambridge University Press.
Zec, Draga. (2006). The syllable. In Paul de Lacy. (ed.), *The Cambridge handbook of phonology*. 161-194. Cambridge University Press.