Length and Quality in Welsh Mid Vowels: New Evidence from Mid-Wales[1]

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1. Introduction

Previous accounts of the vowel systems of Welsh (e.g. G. E. Jones 1984; Ball & Williams 2001; Awbery 2009; Mayr & Davies 2011; Hannahs 2013) have focused mainly, if not exclusively, on differences of length, i.e. distinctions between long and short vowels, thereby assuming that vowel quality is largely determined by vowel length in Welsh. However, the empirical quantitative results presented in this article will show that the situation is far more complex, at least in two distinctive areas of mid-Wales where a substantial degree of variation can be seen in the quality of various vowels. Indeed, it will be clear from the discussion that follows that vowel length is only one factor with which vowel quality varies, and that other linguistic factors appear to be equally as important, e.g. the vowel's position within the word (i.e. the syllabic environment), and the phonetic context (e.g. whether the vowel is followed by a single consonant or a cluster in stressed penultimates). It will therefore be argued that previous assumptions that Welsh vowels of the same length behave uniformly across all contexts do not appear to hold, and that the effects of other relevant linguistic factors have been largely overlooked.

The two localities concerned in this study are two parts of the Merionethshire coast, namely the area around Harlech and the Tywyn district (known in Welsh as Bro Dysynni), as shown in Map 1. Due to the comparative nature of the quantitative results obtained in these two areas, this article's analysis of vowel quality variation will not confine itself to structural (or

[1] This study draws on material first presented in my PhD thesis (Rees 2013). Another three phonological features were also analysed in this study, namely the high central vowels [ɨ(ː)] / [ɘ], the fronted and raised low vowel [æ(ː)], and the palatalised velar plosives [kj] / [gj], and are discussed in detail in Rees (2013: 246–389) and Rees (2015). I am greatly indebted to Dr Gwenllian M. Awbery, not only for her supervision of this thesis, but also for her comments on previous versions of this article. I would also like to express my gratitude to my colleagues, Prof. Diarmait Mac Giolla Chríost, Dr Dylan Foster Evans and Prof. Glyn E. Jones, for their helpful comments, to Dr Jonathan Morris for assisting me greatly with some statistical analyses, and to two anonymous reviewers for their valuable suggestions.

language internal) factors, but will also consider external factors, particularly the role that geography plays. Indeed, since mid-Wales is a well known (but understudied) transition zone between north and south Wales, it will be argued that the significant differences that emerge between the two areas (including some unexpected differences in the stressed penultimate syllable) are not only valuable to our knowledge of phonological transitions in mid-Wales, but are also relevant to phonological systems in other parts of Wales.

Map 1: The locations of Harlech and Tywyn on the Merionethshire coast

Adapted from http://commons.wikimedia.org/wiki/File:Wales_location_map.svg

General overviews of Welsh dialects distinguish between northern and southern phonological systems, and report that systematic differences are found between the vowels of these two main varieties of Welsh (e.g. Awbery 1984; idem 2009; G. E. Jones 1984; Ball & Williams 2001; Hannahs 2013). There is a fuller inventory in the northern system due to an absence of

high central vowels in southern varieties of Welsh.[2] This main difference between the vowel systems of both northern and southern dialects is clearly illustrated in Diagrams 1 & 2 by Awbery (2009: 360) where two fewer vowels are shown in the southern inventory.

Diagram 1: The vowel inventory of northern Welsh (Awbery 2009: 360)

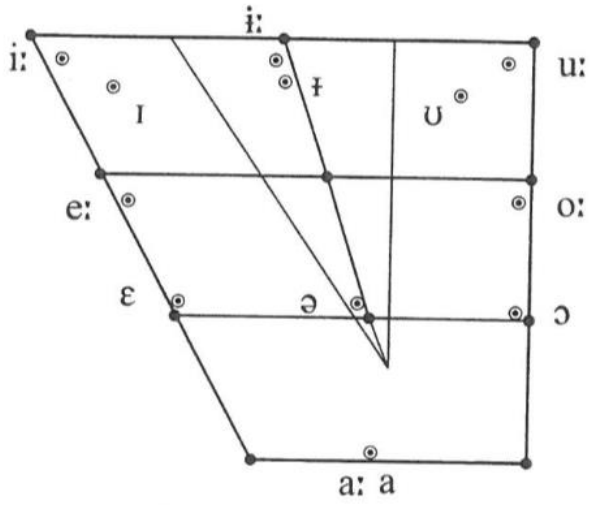
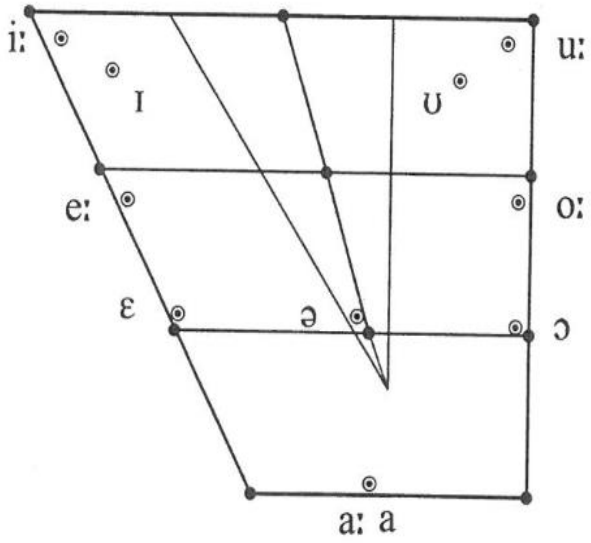


Diagram 2: The vowel inventory of southern Welsh (Awbery 2009: 360)



As shown in Diagrams 1 & 2 above, pairs of contrastive long and short vowels are found in six positions in north Wales, and in five in south Wales, together with the short mid central

[2] See Rees (2016) for a detailed analysis of the way in which the contrast between the high central [ɨ(ː)] / [ɨ] and the high front [i(ː)] / [ɪ] is neutralised in parts of mid-Wales.

[ə] (which has no equivalent long vowel) in both regions.[3] Some complications arise however when we look more closely at the quantity-quality interaction, i.e. the relationship between vowel length and vowel quality in these pairs of vowels. Indeed, what is perhaps contentious about Awbery's (2009: 359–60) interpretation is that it assumes that these pairs of long and short vowels differ from each other in terms of quality as well as length in both north and south Wales. Most previous reports on the phonology of Welsh have claimed in fact that clear differences exist between long and short vowels in south Wales in terms of their quality, but that these qualitative differences are minimal in north Wales (G. E. Jones 1984: 57; Ball & Williams 2001: 36). Some earlier sources (e.g. Sweet 1882–4; Fynes-Clinton 1913) went even further by maintaining that no qualitative differences whatsoever existed between long and short vowels in parts of north Wales.

In view of these reported differences between the phonological systems of north and south Wales, it has become apparent that very little is known in fact about what happens in the transition zone of mid-Wales, and that a detailed investigation of the relationship between the length and quality of vowels in different parts of this region would be valuable.[4] This article will therefore focus on the variation found in the aforementioned two areas of this transition zone between pairs of vowels in two specific articulatory positions, namely the front mid vowels [e(ː)] / [ɛ(ː)] "e", and the equivalent back mid vowels [o(ː)] / [ɔ(ː)] "o".[5] This will obviously enable a detailed comparison to be drawn between the use of these front and back vowels in the two areas. The choice of these two pairs of vowels is largely based on the apparent greater qualitative differences in this position than is reported for high and low vowels (see, for instance, Diagrams 1 & 2 above). In the near future, it would be useful to

[3] A further simplification of the vowel system is found in some of Pembrokeshire's traditional dialects due to the absence of the short central vowel [ə] (i.e. the schwa vowel) which is replaced by high vowels, i.e. either front [i] / [ɪ] or back [u] / [ʊ] (for further details, see Awbery 1986: 52–85).

[4] It may be worth noting here that although the Harlech area is considered as a part of 'mid-Wales' in this article, mainly because of the use of several typically mid-Walian linguistic features among its speakers, most of this area's inhabitants identify as 'north-Walians' or people from 'north-west' Wales. Further research is required however to see whether linguistic developments in the Harlech area have coincided with any changes in people's geographical identity.

[5] Note that (ː) in this article indicates that vowel length is optional, i.e. that long [eː]/[ɛː]s as well as short [e]/[ɛ]s are considered, for instance.

extend this study to a full-scale investigation of quantity-quality interactions in pairs of Welsh vowels.

The research questions of this study are as follows:

1. To what extent is there a clear-cut relationship between length and quality in the Welsh mid vowels of two specific areas in mid-Wales? Do we find, for instance, that short vowels are normally open-mid, and that long vowels are usually close-mid?
2. To what extent do the results yielded in the two areas differ from each other, and if so, what could be the significance and wider implications of these differences?

Section 2 will provide a critical summary of previous researchers' accounts of the vowels under discussion in this article. Section 3 will then outline the methodology of this study, explaining how informants were selected and recorded, and how the relevant phonological variables were analysed, and will lead into the empirical results in section 4. Section 5 will then discuss the main findings of this article, and the conclusions and implications of this study for future work on Welsh phonetics and phonology will be summarised in section 6.

2. Previous reports

The following review of previous reports will concentrate first on general accounts of differences between the vowel systems of Welsh dialects in north and south Wales, and will then turn to studies which have focused specifically on the use of mid vowels in Montgomeryshire and southern Merionethshire.[6]

2.1. Previous accounts of the vowel systems in north and south Wales

The vowel system in south Wales is relatively straightforward and well documented. In monosyllables and penultimates, long and short vowels may appear, and the choice between them may be contrastive or predictable according to what immediately follows (Awbery 1984: 65–70; Wmffre 2003: 121). As for the quality of these vowels in south Wales, Welsh dialectologists are clearly in agreement that the difference between the long and short vowels of monosyllables is qualitative as well as quantitative (Ball & Williams 2001: 35–6; G. E. Jones 1984: 57; Awbery 1984: 65–70). This is clearly exemplified in Table 1 in the case of mid vowels where the long vowels are close-mid in quality whilst their short counterparts are open-mid.

Table 1: Long and short mid vowels in monosyllables in South Wales

Long vowels	[eː], e.g. [gweːn] "gwên" *smile* [oː], e.g. [moːr] "môr" *sea*
Short vowels	[ɛ], e.g. [pɛn] "pen" *head* [ɔ], e.g. [mɔr] "mor" *so*

[6] The relevant previous analyses of other linguists (discussed here throughout sections 2.1. and 2.2.) will focus solely on vowels in monosyllables and stressed penultimates due to the fact that the detailed results of section 4 of this article will focus exclusively on these contexts. Since both the Harlech and Tywyn dialects of Welsh neutralise the contrast that is seen in other parts of Wales between [a] / [æ] "a" and [ɛ] / [e] "e" in unstressed final syllables as [a] / [æ] "a", e.g. in [ardal] "ardal" *area* and [halan] "halen" *salt*, instances of the front close-mid and open-mid vowels are very rare in this context. Consequently, it was realised that a detailed comparison between the front and back vowels would not be possible for unstressed final syllables. The geographical distribution of this particular neutralisation (in both the north-west and the south-east of Wales) is illustrated and discussed in B. Thomas & P. W. Thomas (1989: 40–2), and a detailed analysis of its historical development in north Wales is given in Awbery (2012).

In stressed penultimates however, some detailed phonological studies (e.g. Awbery 1986: 7–11 & 29–32; Wmffre 2003: 121–6; Iosad 2015; idem 2017: 145–55) have revealed that the situation is less uniform across south Wales since differences have been identified between south-eastern and south-western varieties of Welsh, as shown in Table 2 below in the case of mid vowels. The clear-cut quantity-quality relationship that is seen in monosyllables across south Wales is paralleled only in south-east Wales as far as the penultimate syllable is concerned (see C. H. Thomas 1976: 350–1). On the other hand, in parts of south-west Wales, e.g. Pembrokeshire, two distinguishable allophones, namely the open-mid [ɛː] / [ɔː] and the close-mid [eː] / [oː], have been established as long mid vowels in penultimates. These allophones are in complementary distribution with the choice between them governed by the vowel quality of the final unstressed syllable. In [tɛːbig] "tebyg" *similar* and [gɔːlug] "golwg" *sight* for example, the high vowels of the final syllables trigger the open-mid variants in the penultimate syllable; conversely, in [eːde] "edau" *thread* and [koːda] "codaf" *I rise*, the mid or low vowels of the final syllables trigger the close-mid vowels in the penultimate syllable. The variation seen here in the quality of penultimate vowels is important in that it clearly shows not only that open-mid articulations are possible in Welsh long vowels, but also that it cannot simply be assumed that all long vowels behave similarly across all contexts.[7] Despite these differences between south-east and south-west Wales, it should be emphasised that the distribution of short vowels is similar in both regions in stressed penultimates, as shown in Table 2.

[7] Interestingly, a footnote by G. E. Jones (1984: 63) records one of Peter Wynn Thomas's observations regarding the quantity-quality interactions of Welsh vowels in stressed penultimates based on his fieldwork in south-east Wales: '[Peter Wynn Thomas] informs me that he has observed instances of the length factor being omitted in the penultimate which suggests that of the qualitative and quantative [*sic*] features which mark the close long vowels it may be that it is the qualitative which is primary'. It appears therefore that the close-mid articulations [e] and [o] may appear in short vowels (as well as in long ones) in the south-east, and that the relationship between length and quality is sometimes more complex than which is reported by other authors such as C. H. Thomas (1976: 350–1).

Table 2: Long and short mid vowels in stressed penultimates in South Wales

	South-east Wales	**South-west Wales**
Long vowels	[eː], e.g. [teːbig] “tebyg" *similar* [eːde] “edau” *thread* [oː], e.g. [goːlug] “golwg” *sight* [koːda] “codaf” *I rise,*	[ɛː], e.g. [tɛːbig] “tebyg" *similar* [eː], e.g. [eːde] “edau” *thread* [ɔː], e.g. [gɔːlug] “golwg” *sight* [oː], e.g. [koːda] “codaf” *I rise*
Short vowels	[ɛ], e.g. [bɛrwi] *to boil* [ɔ], e.g. [hɔɬɔl] “hollol” *complete*	

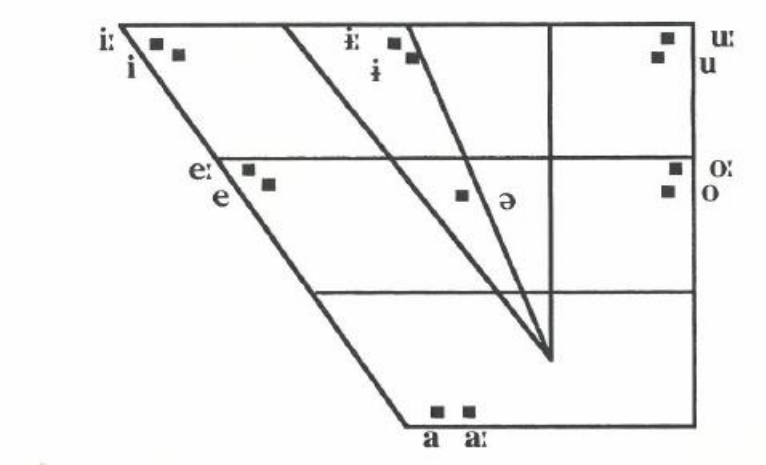
Turning next to the situation in north Wales, both long and short vowels may appear in the monosyllables of this part of the country too, and once again, the choice between them may be contrastive or predictable according to what immediately follows (Awbery 1984: 70–3). The rules are not identical to those of south Wales though, e.g. vowels are short in the north when followed by the later fricative [ɬ], e.g. in [pɛɬ] “pell” *far*, but are long in the south in the same context, e.g. in [peːɬ]. In the stressed penultimates of the northern system however, this system breaks down: only short vowels may appear in this context, regardless of what consonant or cluster follows (Awbery 1984: 72–4). The only instances of long vowels arising in the penultimate syllable in north Wales are found in one specific context, namely in hiatus, i.e. when one vowel is immediately followed by another vowel in an adjacent syllable, e.g. in [ɬeːɔl] “lleol” *local* and [soːar] “Soar” (a place-name).[8]

Much less consensus exists as to whether the difference between long and short vowels in north Wales is qualitative as well as quantitative, as is reported for south Wales. Ball & Williams (2001: 36), for instance, recognise that ‘[d]etailed […] accounts of the articulation of northern vowels are not easily found’ and that, consequently, ‘disagreement exists’

[8] Since the influence of specific types of segments on vowel length in different varieties of Welsh is already well documented (see, for example, Awbery 1984, Williams 1989: 179 and Hannahs 2013: 34–7), this article will not replicate the full details of these accounts. However, it should be borne in mind that the two areas under discussion in this study follow the rules of the northern system regularly as far as monosyllables are concerned, e.g. vowels are always short in the two areas when followed by the later fricative [ɬ], e.g. in [pɛɬ] “pell” *far*, and are always long when followed by a fricative + plosive cluster, e.g. in [poːsd] “post” *post*. Similarly, the distribution of long and short vowels in stressed penultimates is consistently in line with that of the northern system in Harlech, but is slightly less regular in Tywyn due to some examples of half long vowels varying with short vowels, e.g. [gweˑnar] ~ [gwenar] “Gwener” *Friday* (for full details, see Rees 2013: 118–54).

regarding qualitative differences between long and short vowels. They go on nevertheless to 'assum[e] [that] only length differences are found [in north Wales]'. This assumption is illustrated in Diagram 3 where it is implied by the symbols used that the quality of the short and long vowels in question are always close-mid, i.e. [eː] / [e] and [oː] / [o]. It is unclear however whether these conclusions are based on any concrete data, or for that matter, whether a consistent use of open-mid vowels, i.e. [ɛː] / [ɛ] and [ɔː] / [ɔ], was ever considered a possibility by Ball & Williams for north Wales.

Diagram 3: The main vowel phonemes of northern Welsh (Ball & Williams 2001: 36)



On the other hand, G. E. Jones's (1984: 57) only comment on the situation is that '[t]he clear qualitative differences between long and short vowels found in S[outh] W[ales] is [*sic*] far less marked in N[orth] W[ales]', and that '[i]n Anglesey varieties of Welsh […] the qualitative difference between long and short [vowels] is on the whole slight […] in all vowel areas'. Although this general interpretation of the situation seems to be in line with that of Ball and Williams (2001), it is unclear whether these two accounts are actually in agreement with each other in terms of the precise vowel qualities in question. Indeed, it may be argued that G. E. Jones is as likely to be referring here to a constant use of the open-mid vowels [ɛː] / [ɛ] and [ɔː] / [ɔ] in north Wales as to the possibility of a uniform usage of the close-mid vowels [eː] / [e] and [oː] / [o].[9] Consequently, both close-mid and open-mid realisations are shown in Table 3 (for monosyllabic forms in north Wales) and Table 4 (for stressed

[9] Recent personal communication with G. E. Jones (in 2016) has indeed confirmed that he is of the view that a constant use of open-mid vowels is to be observed in Anglesey, especially in younger generations' varieties of Welsh.

penultimates in north Wales), but it should be borne in mind that a considerable degree of uncertainty exists as to the precise qualities of both long and short vowels across this region.

Table 3: Long and short mid vowels in monosyllables in North Wales

Long vowels	[eː] / [ɛː], e.g. [gweːn] / [gwɛːn] "gwên" *smile* [oː] / [ɔː], e.g. [moːr] / [mɔːr] "môr" *sea*
Short vowels	[e] / [ɛ], e.g. [pen] / [pɛn] "pen" *head* [o] / [ɔ], e.g. [mor] / [mɔr] "mor" *so*

Table 4: Long and short mid vowels in stressed penultimates in North Wales

Long vowels	[eː] / [ɛː], e.g. [ɬeːɔl] / [ɬɛːɔl] "lleol" *local* [oː] / [ɔː], e.g. [soːar] / [sɔːar] Soar (a place-name)
Short vowels	[e] / [ɛ], e.g. [tebig] / [tɛbig] "tebyg" *similar* [eda] / [ɛda], "edau" *thread* [o] / [ɔ], e.g. [golug] / [gɔlug] "golwg" *sight* [koda] / [kɔda] "codaf" *I rise*

Despite these complexities, the results of Mayr & Davies's (2011) more recent acoustic study are unequivocally at odds with the descriptive accounts above (G. E. Jones 1984; Ball & Williams 2001). This study was based on the recordings of 20 male university students aged between 18 and 21 at the time whose native language was Welsh; 10 of which were from parts of north-west Wales (Gwynedd and Anglesey), and another 10 from parts of south Wales (Carmarthenshire and Swansea). It is important to note that one of the main discoveries of Mayr & Davies's study was that long and short vowels were shown to differ significantly on the basis of quality as well as quantity, not only in south Wales, but also in the north of the country. The following recommendation is consequently made:

> An implication of this finding is that the symbols used to represent Southern Welsh monophthongs may also be appropriate for those of Northern Welsh. (Mayr & Davies 2011: 18)

It is worth emphasising here though that the precise qualities of the long /eː/ and /oː/ were not found to be identical in both north and south Wales, but rather generally more open in the north (Mayr & Davies 2011: 19). However, the limitation of this particular study is that it

only concerns monosyllabic forms.[10] No consideration is therefore given to the possibility that the situation may be very different in other polysyllabic contexts, e.g. in the penultimate syllable. In other words, it is assumed that short or long vowels behave homogeneously across all environments. Surprisingly, no studies of variation in the quality of penultimate vowels in north-west Wales have yet been conducted, as noted by Wmffre (2003: 121).[11] The results presented in section 4.2 of this paper will therefore be important in filling this gap.

2.2. Previous accounts of mid vowels in mid-Wales

Apart from studies that focus specifically on various parts of mid-Wales (discussed below), it is worth mentioning two different general interpretations of the vowel system in mid-Wales, both of which are concerned with stressed penultimates only. The first description by Awbery (1984: 74–6) is concerned with vowel length only, not quality, and argues that the transition which occurs between the northern and southern vowel systems makes it necessary for three discrete systems to be established, including a 'buffer zone [that] extend[s] across mid Wales and probably up into the north-east' (1984: 74).[12] It is proposed that this 'buffer zone' is distinct from the other two systems in that long and short vowels appear in free variation in penultimates of all types in this region, consequently giving rise to '[…] an interesting blend of northern and southern features'. The second interpretation by Wmffre (2003: 121–6) on the other hand is not identical to Awbery's, and is concerned with variation in vowel quality as well as vowel length in penultimates. He proposes that the boundary-line for Awbery's '[mid-Wales] buffer zone' needed to be drawn further to the north, thereby distinguishing between the vowel system of south-west Wales (the whole of Ceredigion included) and that of mid-Wales. Wmffre also argues for two separate vowel systems for south-west and south-

[10] It is also noteworthy that most of the target words of this study were 'nonsense words', e.g. "hed" [hɛd] and "hod" [hɔd], many of which do not resemble native Welsh words in terms of their phonological rules (for further details, see Mayr & Davies 2011: 4).

[11] It is noteworthy however that G. E. Jones (1984: 64) identifies 'two clear contextual allophones' for mid front /e/ in Anglesey varieties of Welsh: he specifies that the open-mid [ɛ] occurs in penultimates when [i̯], [ɔ] and [u] appear in the final syllable, e.g. in [mɛli̯n] "melyn" *yellow*, whilst 'a much closer mid front vowel' occurs when the front vowels [i] and [a] appear in the final syllable, e.g. in [mẹlin] "melin" *mill*.

[12] The likelihood of a distinct vowel system that spreads from parts of mid-Wales to north-east Wales strongly suggests that it would be more accurate to describe the 'northern system' discussed above as a 'north-western' system.

east Wales due to the quality differences that exist between both areas (see 2.1 above for details). Clearly, on the basis of Awbery and Wmffre's descriptions, the geographical distribution of mid-Wales's transitional vowel system is unclear, especially as Wmffre does not seem to associate this system with any part of Merionethshire. Further research is therefore required before the nature of the vowel system in mid-Wales (and its relationship with other vowel systems) will be fully understood.

Similarly to Awbery and Wmffre's general interpretations of the vowel system in mid-Wales, studies that focus specifically on the use of mid vowels in various parts of Montgomeryshire and southern Merionethshire also paint a mixed picture. Indeed, three main interpretations may be inferred from the different phonological analyses conducted in mid-Wales, and are summarised below.[13]

2.2.1. Length differences only, but no variation in quality

Alf Sommerfelt's interpretation of mid vowels in *Studies in Cyfeiliog Welsh* (1925) concentrates mainly on speakers from the Llanbryn-mair area in Montgomeryshire (11 miles to the east of Machynlleth), and some ambiguities arise in the first instance from the use of terms and symbols promoted at the time by the *Association Phonétique Internationale* that preceded the current IPA symbols.[14] It is noted for example that the symbol *e* represents 'a half open *e*' (1925: 7), and likewise, that the symbol *o* indicates 'a half open vowel of the French type in *pot, faux*' (1925: 11). Although the term 'half open vowels' would correspond today to [ɛ] and [ɔ] in the IPA, there is some basis to maintain that Sommerfelt's examples of the French forms *pot* and *faux* actually point to half close (or close-mid) articulations of these vowels, i.e. [e] and [o] rather that [ɛ] and [ɔ]. Indeed, it is confirmed in several phonological accounts of spoken varieties of French that it is the close-mid vowel [o] which is normal at the end of open syllables in words such as *pot* and *faux* (see, for instance, Walker 2001;

[13] Note that all of the transcriptions provided below are noted in the same way as they appeared originally, and may be different from the transcription conventions adopted in other sections of this article.

[14] Symbols of the *Association Phonétique Internationale* were also employed in previous studies of Welsh dialects by Henry Sweet (1882–4) and O. H. Fynes-Clinton (1913).

Schane 1968, and Gougenheim 1935).[15] Be that as it may, the main point arising from Sommerfelt's phonological analysis of the Llanbryn-mair area in Montgomeryshire is that hardly any differences are identified between the quality of long vowels and that of short vowels. Consequently, the symbols *e* / *e:* (for the front vowels) and *o* / *o:* (for the back vowels) are constantly used for various contexts, e.g. *he:n* "hen" *old*, *kefil* "ceffyl" *horse* and *geneθ* "geneth" *girl*; *ko:χ* "coch" *red*, *korf* "corff" *body*, *moχin* "mochyn" *pig* and *kostjo* "costio" *to cost*. Sommerfelt does mention however a 'somewhat more open *e*' (1925: 7) appearing before [r] in some words, and conversely, he makes the following point regarding the equivalent back vowels:

> Occasionally it may be more narrow than the short *o*. In *po:st* 'post' it is decidedly narrow, probably through the influence of the English pronunciation of the word. (1925: 11)

It is clear that Sommerfelt did not generally find that long and short vowels differed on the basis of quality.[16] However, due to his ambiguous use of terms and symbols, we cannot know for certain what exactly the precise vowel qualities that he was endeavouring to convey were. It could therefore be interpreted that they can be anywhere between open-mid [ɛː] / [ɔː] and close-mid [eː] / [oː].

2.2.2. Length and quality vary, but little or no variation within contexts

A phonological study of the Welsh spoken in another part of mid-Wales, namely Llanfachreth (near Dolgellau) in Merionethshire, was carried out by R. O. Jones (1967) over 40 years later. This study's interpretation of the close-mid and open-mid vowels in the Llanfachreth area is on the whole straightforward, and is summarised by R. O. Jones himself in the following sentence:

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[15] All three authors note that the use of both the open-mid [ɔ] and the close-mid [o] are predictable in French, depending on the actual phonetic context. The principle is summarised neatly by Schane as follows: 'One must distinguish between those /o/ which occur in final position and those which are found in a closed syllable. Phonetically, /ɔ/ never occurs finally; one only finds /o/ in this environment' (1968: 51).

[16] In the light of this conclusion, it is worth quoting Wmffre's (2003: 8) interpretation of early phonological analyses on Welsh varieties: 'For a phonemicist of Welsh […] it is largely a matter of choice in transcription as to which feature – length (quantity) or aperture (quality) – should take precedence. Early in the twentieth century phoneticians such as Fynes-Clinton (1913) and Sommerfelt (1925), when describing Welsh, emphasized length […]'.

> Dyffryn Nantlle and Llanfachreth […] have only two degrees of length – long and short, and the distinguishing features between different phones are qualitative and quantitative. (1967: 92)

Consequently, close-mid articulations are seen in all of Llanfachreth's examples of long vowels, e.g. [ɬeː] "lle" *place*, [keːg] "ceg" *mouth*, [ɬoː] "llo" *calf* and [noːs] "nos" *night*, whilst open-mid variants are usually seen in short vowels of several contexts, e.g. [pɛnː] "pen" *head*, [tɛnːa] "tenau" *thin*, [tɒpː] "top" *top*, [fɒrk] "fforc" *fork* and [kɒrɒn] "coron" *crown*. The clear differences seen here between the quality of long and short vowels is completely at odds with the qualitative uniformity portrayed for these vowels in the Llanbryn-mair area by Sommerfelt. However, this analysis by R. O. Jones depicts a wholly stable situation with no suggestion of variation within any context whatsoever, neither between close-mid [eː] / [oː] and open-mid [ɛː] / [ɔː] in long vowels, nor between open-mid [ɛ] / [ɒ] and close-mid [e] / [o] in short vowels.

D. W. Griffiths's (1974) study of lexical features in the area around Llanfair Caereinion in northern Montgomeryshire also gives a brief outline of the phonological features of this district. Similarly to R. O. Jones's account of the Llanfachreth dialect, Griffiths's analysis of monosyllables and stressed penultimates imply that long and short vowels can be distinguished in terms of their quality as well as their length: the close-mid vowels [eː] / [oː] always appear in long vowels, e.g. [treː] "tref" *town*, [ɬeːol] "lleol" *local*, [ɬoː] "llo" and [soːar] "Soar" (a place-name), and conversely, the open-mid variants [ɛ] / [ɔ] turn up in all short vowels of these syllabic contexts, e.g. [hɛl] "hel" *to collect*, [wɛdin] "wedyn" *after*, [ɬɔŋ] "llong" *ship* and [gɔrmɔd] "gormod" *too much*. It is interesting therefore that Griffiths' interpretation of the clear qualitative difference between long and short vowels in the Llanfair Caereinion district contrasts so strikingly with Sommerfelt's account of the same vowels in the Llanbryn-mair area in the same county.[17]

[17] It should also be noted that Griffiths' analysis is not identical to that of R. O. Jones for Llanfachreth since it is emphasised that variation between open-mid and close-mid articulations is common in one specific syllabic context, namely in final unstressed syllables. Examples such as [buked] ~ [bukɛd] "bwced" *bucket* and [agor] ~ [agɔr] "agor" *to open* are cited, for instance. It should be stressed however that the dialect of Llanfachreth is similar to that of Harlech and Tywyn insofar that it neutralises the contrast that is seen in other parts of Wales between [a] / [æ] "a" and [ɛ] / [e] "e" in unstressed final syllables as [a] / [æ] "a", e.g. in [ardal] "ardal" *area* and [halan] "halen" *salt*.

2.2.3. Length and quality differences; widespread variation

Turning finally to the most recent source, namely *The Welsh Dialect Survey* (A. R. Thomas et al. 2000), an analysis of the forms recorded in this survey for several parts of mid-Wales suggests that the use of the mid vowels in question is not by any means uniform, neither within specific localities and contexts nor across the region.[18] First, with regards to long vowels of monosyllables, variation between the front vowels [eː] and [ɛː] arises in 10 of the 19 localities investigated in mid-Wales, and similarly, the use of both back vowels [oː] and [ɔː] emerges in 6 of the 19 areas.[19] Examples of variation within the same areas include [heːn] "hen" *old* ~ [sɛːr] "sêr" *stars* in Llanfachreth (locality 47), and [koːr] "côr" *choir* ~ [nɔːs] "nos" *night* in Barmouth (locality 46). It is important to emphasise however that there is no clear geographic distribution to be found since instances of [eː] ~ [ɛː] and [oː] ~ [ɔː] are scattered all over the region in question.[20] It is also important to note that areas for which no variation is noted (i.e. the majority in the case of the back vowels) show a consistent use of the close-mid vowels [eː] and [oː] (rather than a constant use of the open-mid vowels [ɛː] and [ɔː]). As for the short vowels of monosyllables, the survey's forms show a far more uniform situation whereby a consistent use of the open-mid vowels [ɛ] and [ɔ] in forms such as [pɛn] "pen" *head* and [tɔn] "ton" *wave* is seen in almost every area,[21] the only exception being Llangadfan (locality 38) where there is one example of [gweɬ] "gwell" *better*. On the basis of Chambers & Trudgill's (1998: 104–18) analysis of transition zones, and Trudgill's (1986: 62–5) investigation of dialects in contact, [gweɬ] may be interpreted as a 'fudged lect' of northern [gwɛɬ] and southern [gweːɬ], and could be considered as an 'interdialect' form.[22]

[18] The *Welsh Dialect Survey* was used to analyse and compare the data of 19 discrete areas in mid-Wales, which were subsequently represented on coloured maps. A detailed description of the way in which this investigation was conducted, together with a full list of the areas studied, is seen in Rees (2013: 42–4).

[19] The seven words analysed for the front vowels were "te", "hen", "pêl", "sêr", "gwres", "gwellt" and "hesb", and the other seven words for the back vowels were "to", "tôn", "stôl", "côr", "nos", "cosb" and "hollt".

[20] For illustrated coloured maps of the variation patterns for each context discussed in this analysis, see Rees (2013: 78–82).

[21] The relevant words for the front vowels are "pen", "gweld", "pell", "gwell", "cer" and "het", and the relevant ones for the back vowels are "ton", "siom", "llong", "lol", "(ar) goll" and "cloc".

[22] No such 'interdialect' forms were identified in monosyllabic forms of the two areas analysed in this study, although some instances in the Tywyn area of half long vowels varying with short vowels in stressed penultimates could perhaps be interpreted in this way (see section 5.2. for further details).

On the other hand, short vowels in stressed penultimates reveal substantially more variation.[23] Indeed, interchange between front [e] and [ɛ] appears in almost every area. The only exceptions are Corris (locality 50, which shows a consistent use of the open-mid [ɛ]) and neighbouring Aberhosan (locality 53, conversely showing a consistent use of the close-mid [e]). Similarly, variation between back [o] and [ɔ] in stressed penultimates is seen in 14 of the 19 localities, whilst the remaining 5 areas show a consistent use of the open-mid [ɔ]. Examples of variation within the same area in this context include [gwelɨ] "gwely" *bed* ~ [kjɛnɪn] "cennin" *leeks* in Barmouth (locality 46) and [ola] "olaf" *last* ~ [pɔbi] "pobi" *to bake* in Harlech (locality 45).

The data obtained for *The Welsh Dialect Survey* therefore suggest that quality variation in mid vowels is commonplace throughout mid-Wales, not only between different contexts, as noted by R. O. Jones (1967) and D. W. Griffiths (1974), but also within the same context in several areas, namely in long vowels of monosyllables and short vowels of stressed penultimates. The widespread variation seen in this survey contrasts sharply with the uniform situation portrayed for these vowels by Sommerfelt (1925), and suggests that a closer look is needed.

[23] The words inspected for the front vowels were "gwely", "celyn", "tenau", "cennin" and "seren", and those analysed for the back vowels were "olaf", "tonnau", "tonau", "torri" and "pobi".

3. Data collection and analysis[24]

Informants were selected in the Harlech and Tywyn districts using the 'friend of a friend' technique which enabled me to draw on people's pre-existing social relationships (Milroy 1987: 66). Contact was thus made with local community members who agreed to function as 'brokers' in the area, and helped me to persuade suitable speakers to participate in interviews with me. In this way I was able to access local social networks, and to be recognised first and foremost, not as a researcher, but as a friend (and, indeed, a relative) of the 'brokers'.[25] The 'friend of a friend' method also proved to be an effective way of obtaining hours of natural and mostly unprompted speech. Random sampling was not used in this study: Welsh speakers are in the minority in these areas, especially in the 65^{+} age-group,[26] and sociolinguists working on other varieties of Welsh have found this technique to be impractical in the context of a minority language (e.g. A. E. Thomas 1998: 92; M. C. Jones 1998: 49).

The social and geographical attributes of the two areas in question may be considered very similar. Apart from the relatively small towns of Harlech and Tywyn, both districts extend inland and consist of rural villages (e.g. Llanbedr near Harlech, and Bryn-crug near Tywyn) and relatively remote valleys, as shown in Maps 2 and 3. The aim therefore was to record a group of people who could be considered similar in social, cultural and educational terms.[27] Broadly speaking, all informants were members of the older generation, i.e. aged 70^{+} when the interviews were held, apart from one speaker from the Tywyn area who was in her early sixties.[28] The reason for focusing on the older generations' usage of Welsh in the two areas

[24] For full account of the methodology of this study, see Rees (2013: 85–116).

[25] This technique has previously been used in several sociolinguistic studies around the world, e.g. in Wales (A. E. Jones 1982; M. C. Jones 1998), England (Britain 1997), New Zealand (Holmes et al. 1991), Austria (Lippi-Green 1989), Australia (Horvath 1985) and Brazil (Bortoni-Ricardo 1985).

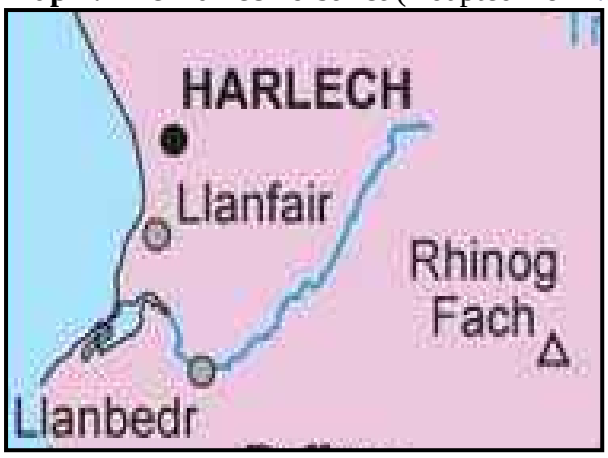
[26] According to the 2011 Census (Office for National Statistics 2012), 35.9% of the 65^{+} age-group are able to speak Welsh in the Harlech ward, whilst the equivalent percentage for the Tywyn ward is at 23.2%. It appears that these relatively low percentages are related to a substantial influx of immigrants from England, many of whom retire to the Merionethshire coast (Aitchison & Carter 1994: 48, 49, 53 & 94; idem 2004: 52; H. M. Jones 2012).

[27] For full details of speakers interviewed in the Harlech and Tywyn districts, see Rees (2013: 103–5).

[28] Incidentally, this speaker (R.P.) was also the 'broker' of this area. Because her spoken Welsh exhibited many phonological features characteristic of mid-Walian dialects, e.g. a consistent use of the fronted and raised low

was that it provided a more direct comparison with other dialectological studies of Welsh varieties in mid-Wales, and also decreased the chances of major language changes that may have occurred, thus increasing the comparability of this study's results with those of previous studies. Moreover, it was also realised that it would be impossible to do justice to the complex phonological patterns which emerged from speakers of the older generations within the time frame of my study if cross-generational comparisons were also to be drawn.[29] Consequently, it was decided that a thorough analysis of the phonological features of older groups of speakers would be an appropriate approach in the first instance, and that it would serve as a valuable baseline for any future developments.

Map 2: The Harlech district (Adapted from **www.ordnancesurveyleisure.co.uk/leisure**)



Map 3: The Tywyn district (Adapted from **www.ordnancesurveyleisure.co.uk/leisure**)

vowel [æː] in monosyllables such as [tæːd] "tad" *father* and [gwæːɬd] "gwallt" *hair*, and since she too was from a similar background to the other participants interviewed, I decided to include her in the Tywyn district sample.

[29] It should also be borne in mind that the analyses of this article were only a part of a larger project on four different phonological features in the two areas.

Table 5: Informants' details[30]

AREA	SPEAKER	MALE / FEMALE	LIVING IN	DATE OF BIRTH
Harlech	D.O.	M	Harlech	11/10/1918
	T.R.	M	Harlech	31/01/1929
	E.J.	F	Cwm Uwch Artro (near Harlech)	26/12/1932
	G.J.	F	Cwm Nantcol (near Llanbedr)	25/02/1933
	C.R.	F	Llanbedr	20/09/1933
	J.E.	M	Llandanwg	25/01/1934
Tywyn	B.R.	F	Abergynolwyn	14/06/1913
	M.V.	M	Tywyn	21/04/1929
	C.D.	M	Bryn-crug	29/09/1929
	G.E.T.	M	Bryn-crug	22/07/1931
	E.W.	F	Llanfihangel-y-pennant (near Abergynolwyn)	04/12/1932
	R.P.	F	Abergynolwyn	27/04/1951

An equal number of male and female informants were chosen in order to assess whether gender differences might prove to be a significant factor (see Table 5). None of the participants had received formal education beyond the age of 16, and with the exception of one male speaker,[31] all had spent the greater part if not the whole of their lives in their communities. Informants therefore resemble fairly closely the NORMs – non-mobile, older, rural males – of traditional dialectology (Petyt 1980: 110–16; Chambers & Trudgill 1998:

[30] The order in which the speakers appear in this table is similar to that of Figures 1–12 in section 4, and is determined in each area by the age of every speaker, i.e. from the eldest to the youngest.

[31] This participant from the Tywyn area (C.D.) had left Wales for England in his early twenties in order to take up a post with the Royal Navy, and had not returned to live permanently in his home community until his retirement. Since English had naturally been his exclusive language of communication in England (with both his family and colleagues), it became apparent from the outset that the phonological patterns exhibited in his Welsh were characteristic of the Tywyn area. This initial perception is indeed confirmed by the linguistic results, some of which are presented in this paper.

29–30), except for the inclusion of female as well as male speakers. They had all grown up in an environment where the use of Welsh as a spoken language was natural throughout the two communities in question, although considerable demographic changes have taken place during their lifetime, primarily due to immigration from England (Aitchison & Carter 1994: 48, 49, 53 & 94; idem 2004: 52; H. M. Jones 2012).

It was clear from my initial phonological analyses that the use of the close-mid / open-mid vowels (i.e. the dependent variables) varied considerably in both the Tywyn and Harlech areas and would require closer examination. The following examples illustrate how variation of this kind was found in a range of different phonological contexts, suggesting that both vowel length and the syllabic environment would be relevant independent variables. Note that the same word may vary between the usage of one speaker and another, and even within the speech of one single informant.

	Harlech	Tywyn
Monosyllables; long vowels:	[treːn]~[°drɛːn] “trên”[32]	- - -
	[moːχ]~[mɔːχ] “moch”	[doː]~[dɔː] “do”
Monosyllables; short vowels:	[mor]~[mɔr] “mor”	[mor]~[mɔr] “mor”
Penultimates; short vowels:	[meðul]~[mɛðul] “meddwl”	[evɔ]~[ɛvɔ] “efo”
	[gorfan]~[gɔrfan] “gorffen”	[nosɔn]~[nɔsɔn] “noson”

Other independent linguistic variables were also considered, including the sentence stress (i.e. whether monosyllables were fully stressed or unstressed in the sentence), and the phonetic context (i.e. whether the vowel was followed by a consonant or a cluster in stressed penultimates). The effect of following vowel height, i.e. the quality of vowels in final unstressed syllables, was also probed, but did not prove to be a crucial independent variable. Moreover, the speakers’ areas, their gender and their age, were considered as potential external independent variables.

[32] Note that °signifies a mutated form throughout this paper.

The recordings were auditorily analysed using a broad phonetic transcription, and were transcribed in a series of audit trails. Each of these focused, not only on a specific phonological variable, but also on a particular linguistic context. For instance, whilst examining the use of the close-mid / open-mid vowels in both areas, the first transcript focused on the forms found in monosyllabic words, whilst the second focused on the penultimate syllable. This approach ensures that careful attention is given to all forms relating to a variable, and that the probability of including every single relevant token in the transcriptions is maximised. It should also be emphasised that samples of my transcriptions (for all speakers and features analysed) were cross-checked by an experienced phonologist in the field of Welsh linguistics. The raw material gathered in this way was then systematically organised for analysis.

The potential impact of various structural factors (i.e. the independent linguistic variables) on speakers' use of mid vowels resulted in the data being divided into several linguistic contexts. The data for each linguistic context were kept separate, and it was not assumed that the vowels under consideration would behave uniformly across all of these contexts. In the same way, the data for each individual were kept separate, and there was no assumption that individuals from a uniform social group would be linguistically similar. This is exemplified in Table 6 which shows some of the forms used by one speaker from Abergynolwyn near Tywyn (B.R.) which relate to one specific context, namely the short (including a few half long) front mid vowels of stressed penultimates which are followed by single consonants only (as opposed to consonant clusters only).

Table 6: Short front mid vowels in penultimates; preceding single consonants only[33]

[e(·)]	[ɛ]
[brenɪn] "brenin" *king* (2)	
[kapeli] "capeli" *chapels* (1)	
	[kɛnɪn] "cennin" *leaks* (1)
[kjerig] "cerrig" *stones* (1)	[kɛrig] "cerrig" *stones* (1)
[knesɨ] "cynhesu" *to warm up* (1)	
[evɔ] "efo" *with* (4)	[ɛvɔ] "efo" *with* (3)
[enu] "enw" *name* (2)	
	[vɛɬɨ] "felly" *therefore* (3)
[°welas] "gwelais" *I saw* (1)	[°wɛlas] "gwelais" *I saw* (1)

In the case of each dependent variable, i.e. the front close-mid / open-mid vowels and the equivalent back vowels, a binary scale was employed, recognising two variants in each case.[34] The precise phonetic value of the two variants may differ slightly from one area to another (and, indeed, from one context to another), but crucially an opposition between two particular values is to be seen in all cases. All the relevant tokens were examined, and the percentages of each variant in each context for each informant were calculated. The total number of tokens obtained by the six speakers of each locality ranged across 12 contexts (represented in section 4 below in Figures 1–12), from 280 to 1383 tokens in the Harlech area, and from 256 to 1521 tokens in the Tywyn district.[35] Consequently, statistical analyses were conducted in order to ascertain whether the differences between the two areas were significant. Pearson's Chi-squared Test with Yates' Correction was conducted in cases where

[33] Note that some half long vowels were included with these "short" vowels. These vowels were identified in a limited number of tokens in Tywyn only, and always appeared to interchange with short vowels, e.g. [gwe·nar] ~ [gwenar] "Gwener" *Friday* and [ko·di] ~ [kodi] "codi" *to rise*. The open-mid vowels were always short in the two areas with no examples of [ɛ·] / [ɔ·] arising.

[34] For a discussion on the difficulties of threefold scales when conducting an auditory analysis of a phonological feature of Welsh, namely the fronted and raised low vowel, see A. E. Thomas (1998: 104).

[35] The raw figures that form the basis of all the results presented in section 4 of this article can be found online in the appendix of my PhD thesis (Rees 2013: LIV–LXXVII).

all variants had ten or more tokens, and in cases where there were fewer than ten tokens per variant, Fisher's Exact Test was applied.

In the following results, it should be noted that the order in which the speakers appear is kept similar for each linguistic context in order to facilitate comparisons, and is determined in each area by the age of every speaker, i.e. from the eldest to the youngest (cf. Table 5 above). The results presented in section 4 will look in turn at the use of close-mid / open-mid vowels in the two areas in question, examining first long vowels in monosyllables, and then short vowels of various types.[36]

[36] Alternations between close-mid and open-mid vowels were also noted in the first elements of diphthongs of various types, e.g. [meun] ~ [mɛun] "mewn" *in* (see Rees 2013: 439–45). However, since the total number of tokens is low in the case of several diphthongs, the following analysis will concentrate exclusively on simple vowels.

4. Results

The following results will demonstrate the extent to which the use of mid vowels varies across different linguistic contexts in both the Harlech and Tywyn areas, and draw comparisons between the variation patterns found in the two districts.[37] Consequently, the data obtained in the two areas are shown side by side, i.e. within the same graphs rather than in separate sections. The results of all 12 speakers analysed appear in each graph – the speakers from Harlech on the left, and the speakers from Tywyn on the right – and in each case, it is the percentage of the relevant close-mid variant, i.e. front [eː] / [e] or back [oː] / [o], that is shown for each speaker. The speakers' names do not appear in the graphs, but note that the order in which they appear is the same as in Table 5 above, and is arranged according to the age of each speaker (i.e. from the eldest to the youngest) in the two areas. The following results are divided into two subsections: the first will be concerned with monosyllables, looking in turn at both long and short vowels; the second subsection will then look in detail at the stressed penultimate syllable.[38]

4.1. Long and short vowels in monosyllables

4.1.1. Long vowels

Long vowels are found in monosyllabic words, but their actual length varies according to whether sentence stress is placed upon the word.[39] Words such as [heːn] "hen" *old*, [peːθ] "peth" *thing*, [poːb] "pob" *every* and [doːd] "dod" *to come* are truly long when stressed, but are shortened when unstressed because emphasis is placed on other words in the phrase, e.g.

[37] For convenience, these districts will henceforth be referred to as 'Harlech' and 'Tywyn', but it should be borne in mind that these terms comprise also the surrounding districts of these towns.

[38] As explained earlier in footnote 6, the following results will concentrate solely on monosyllables and stressed penultimate due to the fact that a detailed comparison between the front and back vowels would not be possible for unstressed final syllables. Similarly, in other polysyllabic contexts, e.g. in prepenultimate syllables and stressed final syllables, the small number of relevant tokens obtained in these environments made it impossible to carry out reliable analyses of their variation patterns.

[39] Cruttenden (1986: 17–8; 30), for example, distinguishes between 'word stress' (or 'lexical stress' as it is sometimes called), 'which tell us which vowels (and hence syllables) are stressed in words', and 'sentence stress', which refers to the type of stress placed on a word in a sentence.

in [hɛm ˈblant] “hen blant” *dear children* and [°bob ˈiːn] “bob un” *every one*. Consequently, these “long” vowels were divided into two separate groups, namely:

- Long vowels; stressed forms;
- Shortened “long” vowels; unstressed forms.

Starting with the truly long vowels of stressed forms then, Figure 1 shows the situation of the front vowels [eː] and [ɛː], whilst Figure 2 reflects the situation of the equivalent back vowels [oː] and [ɔː] in both areas. Looking first at the front vowels, Figure 1 clearly shows that hardly any substantial differences are to be seen between the results obtained in the two areas, and that all speakers from both Harlech and Tywyn display very high percentages, indicating a consistent, or even categorical use of the close-mid [eː] vowel in this context. However, the slightly lower scores of three speakers from Harlech suggest that the use of [eː] is somewhat less stable in this district. Fisher’s Exact Test shows that the difference between the two areas is significant (Fisher’s Exact, $p = 0.0048$).

Figure 1: Long front vowels; stressed monosyllables, e.g. [heːn] “hen” *old* and [nɛːb] “neb” *nobody*

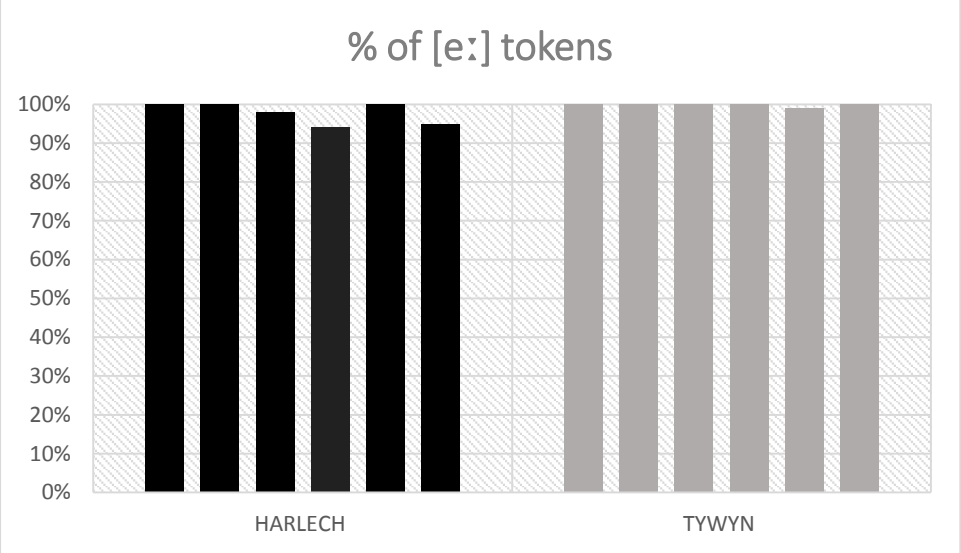
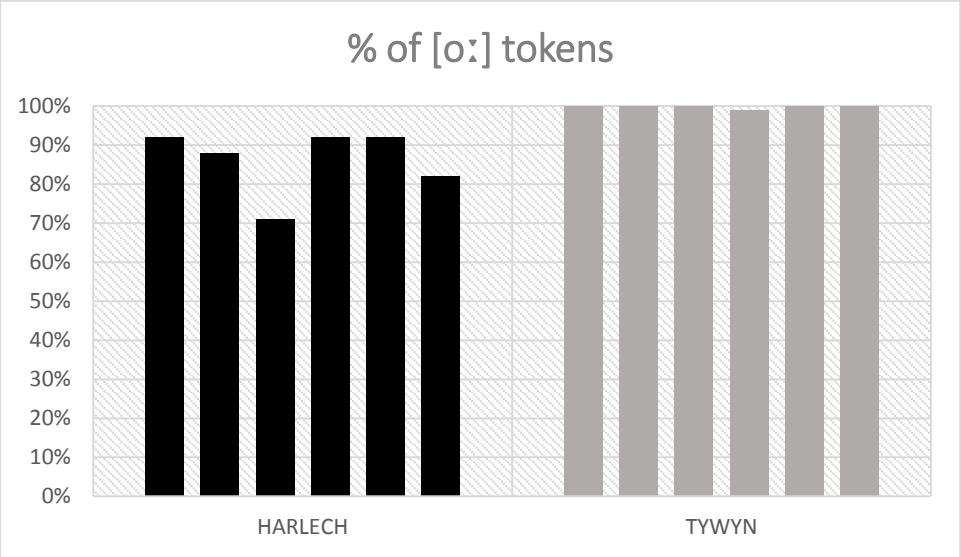


Figure 2: Long back vowels; stressed monosyllables, e.g. [moːr] "môr" ***sea*** **and [mɔːχ] "moch"** ***pigs***



As for the corresponding back vowels, Figure 2 reveals that the use of the close-mid [oː] differs somewhat between the two areas, and that a tendency for the open-mid [ɔː] to be used is much more common in Harlech. Indeed, the percentages of [oː] tokens range from 71% to 92% in this area, indicating that [ɔː] appears to some degree in the language of every speaker from this district. The results yielded for Tywyn on the other hand portray a wholly stable situation whereby the use of the close-mid [oː] is consistently high for all speakers, and similar to their use of the equivalent front vowels. Fisher's Exact Test shows that the difference between the two areas is significant (Fisher's Exact, $p < 0.0001$). It is possible that the more substantial differences exposed in Figure 2 between the two areas may well be in line with the minor divergences seen in Figure 1.

Turning next to the shortened "long" vowels of unstressed forms, the use of front [e] / [ɛ] in this context for both areas is shown in Figure 3, and the equivalent results for back [o] / [ɔ] in Figure 4. A glance at these figures shows that the close-mid vowels are much less common in unstressed than in stressed monosyllables. Although this holds true for both front and back vowels, note that the results for front [e] / [ɛ] and back [o] / [ɔ] are again far from being identical in this context in both areas. On the one hand, Figure 3 shows that a wide range of percentages are seen in the case of the front vowels in both Harlech and Tywyn (63%–22% in the former, and 64%–23% in the latter). Despite this considerable interspeaker variation, a Chi-squared Test shows that the difference between the two areas with respect to the front

vowels is significant (Chi-squared Test with Yates' Correction = χ^2 (1) = 10.233, p = 0.0014). On the other hand, Figure 4 shows that the scores are strikingly lower in the case of the back vowels in both areas (12%–5% in Harlech, and 15%–3% in Tywyn), and that the amount of interspeaker variation is less substantial. A Chi-squared Test shows that the difference between the two areas in this instance is not significant (Chi-squared Test with Yates' Correction = χ^2 (1) = 0.113, p = 0.7371). Clearly then, it cannot be assumed that front and back vowels behave uniformly in either area. However, the main point arising from Figures 1–4 is that the considerable differences between stressed and unstressed forms confirm how important it is to assess the effect of sentence stress on the use of these vowels.

Figure 3: Shortened front "long" vowels; unstressed monosyllables, e.g. [hen] "hen" ***old*** **and [pɛθ] "peth"** ***thing***

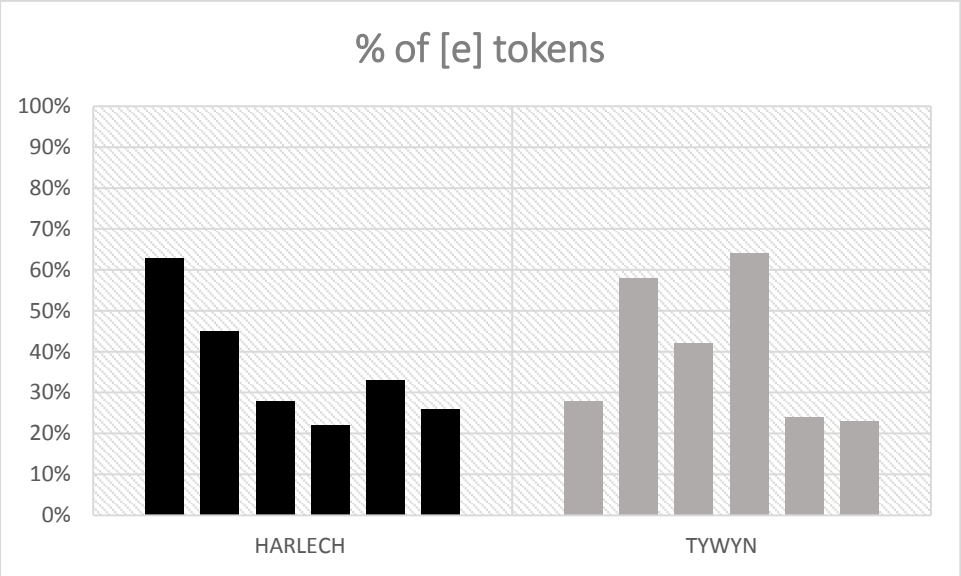
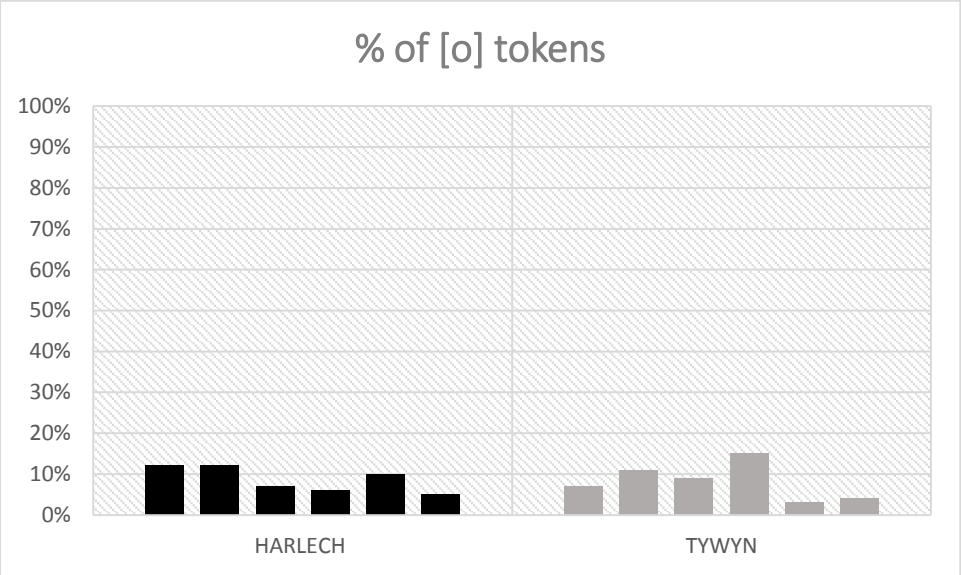


Figure 4: Shortened back "long" vowels; unstressed monosyllables, e.g. [pob] "pob" *every* and [dɔd] "dod" *to come*



4.1.2. Short vowels in stressed monosyllables

How then do the various types of "long" vowels discussed above compare with the equivalent short vowels in stressed monosyllables, i.e. forms such as [gwɛld] "gweld" *to see*, [pɛn] "pen" *head*, [ɔvn] "ofn" *fear* and [fɔr] "ffordd" *road*?[40] The extremely low percentages of close-mid [e] / [o] (or even no-scores by several speakers) in Figures 5 and 6 indicate that it is the open-mid articulations [ɛ] / [ɔ] which are normal in this context in both Harlech and Tywyn with the use of close-mid [e] / [o] in this context restricted to a few exceptional forms, e.g. [vel] "fel" *as* (in Harlech) and [mor] "mor" *so* (in both areas).[41] Fisher's Exact Test shows that the differences between the two areas are not significant, neither in the case of the front vowels (Fisher's Exact, $p < 0.0708$), nor with respect to the equivalent back vowels (Fisher's Exact, $p < 0.3576$).

It may be established therefore that the long and short front vowels of the two areas' stressed monosyllables are virtually the reverse of each other, i.e. [eː] versus [ɛ] (cf. Figures 1 & 5).

[40] The following analysis of short vowels in stressed monosyllables does not consider syllable types since short vowels of this context always appear in closed syllables.

[41] Since the latter form was noted in both areas, it may be proposed that the articulation of [o] in this word may be associated with its emphatic nature, and that it may even be posssible that the form [mor] emerges from the influence of the pronunciation of the English *so*.

However, with regards to the corresponding back vowels, a similar ‘categorical’ contrast can only be seen in Tywyn (cf. Figures 2 & 6), though there are considerable differences to be seen in Harlech also between the speakers’ relatively high percentages of the long back vowel [oː] in stressed monosyllables (ranging from 71% to 92%), as opposed to extremely low scores (or non-existence) of the short back vowel [o] in stressed monosyllables.

Moreover, in view of these differences between the long and short vowels of stressed forms, it appears that the generally lower percentages of the close-mid articulations [e] / [o] in Figures 3 & 4 above imply that the shortened “long” vowels of unstressed forms resemble to some extent the short vowels of stressed forms. This hypothesis seems to be most plausible in the case of the shortened back vowels [o] / [ɔ] which behave much more similarly to the short vowels of stressed monosyllables than to their long counterparts.

Figure 5: Short front vowels; stressed monosyllables, e.g. [pɛn] “pen” *head* and [°verχ] “merch” *girl*

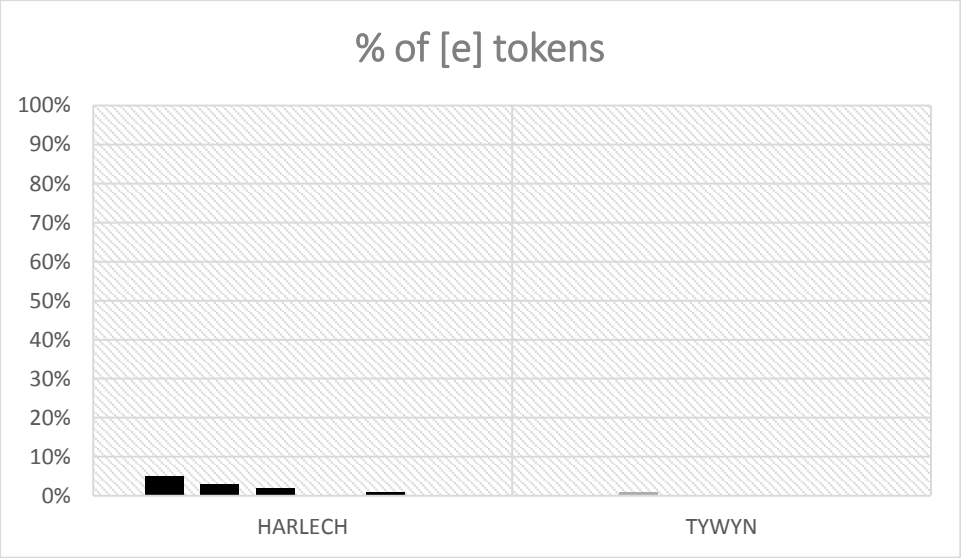
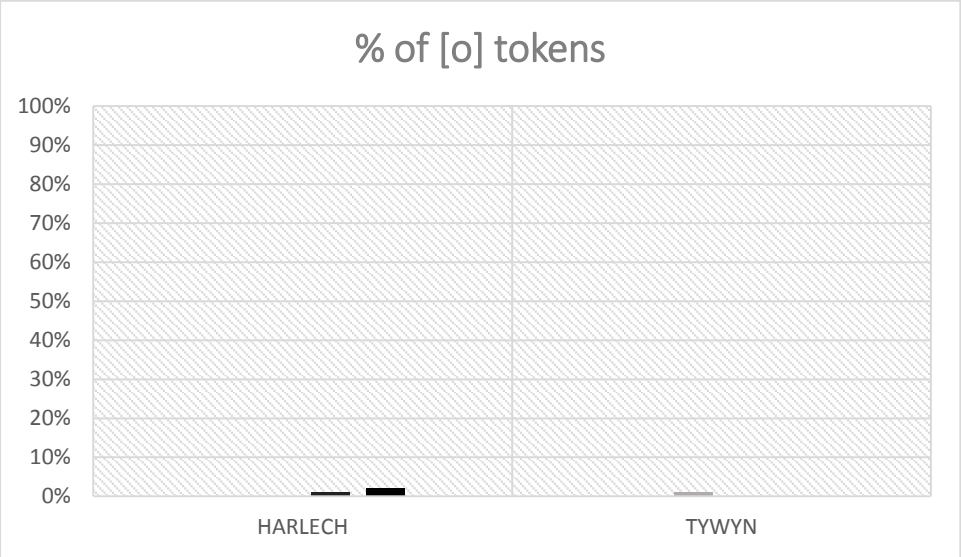


Figure 6: Short back vowels; stressed monosyllables, e.g. [ɔvn] "ofn" *fear* and [mor] "mor" *so*



To summarise the results so far, it has been established that the behaviour of the short front vowels and that of the long front vowels in stressed monosyllables are essentially the opposite of each other in the two areas (cf. Figures 1 & 5). As for the back vowels, a similar contrast can be seen in Tywyn, but differences between the long and short vowels seem to be less 'categorical' in Harlech because of variation between long [oː] and [ɔː] in this area (cf. Figures 2 & 6). It is clear therefore that the quality of these vowels varies to a great degree with their length. It has also been shown that sentence stress is another factor which seems to be influencing the quality of long vowels in monosyllables, and that vowel length in itself cannot always suffice to account for variation in these vowels in monosyllables.

4.2. Short vowels in stressed penultimates

We will turn next to the situation of short vowels in stressed penultimates.[42] It should be stressed that these "short" vowels include some half long vowels which were identified in a

[42] As noted earlier, long vowels are also possible in stressed penultimates, but are confined to one particular context, namely in hiatus, i.e. when the vowel of the penultimate syllable is immediately followed by another vowel in an adjacent syllable, e.g. in [łeːɔl] "lleol" *local* and the place-name [soːar] "Soar". However, it was not possible to carry out a detailed analysis of variation patterns in this specific context due to a shortage of relevant tokens. My analysis of long vowels is thereby limited to monosyllabic forms only. It should also be borne in mind that the effect of sentence stress is not considered in the following examination of short vowels in stressed penultimates because vowels are always short in this context, regardless of whether they are fully stressed or

limited number of tokens. In Tywyn, instances of half long vowels always appeared to interchange with short vowels, e.g. [gwe·nar] ~ [gwenar] "Gwener" *Friday* and [ko·di] ~ [kodi] "codi" *to rise*, but note that the open-mid vowels were always short in this area with no examples of [ɛ·] / [ɔ·] arising. In Harlech on the other hand, no such half long vowels were identified in the stressed penultimate syllable.

4.2.1. All stressed penultimates

Figures 7 and 8 reflect the situation found in Harlech and Tywyn when all tokens containing front [e(·)] / [ɛ] and back [o(·)] / [ɔ] are included, e.g. [peθa] "pethau" *things*, [dɛχra] "dechrau" *to begin*, [hogan] "hogen" *girl* and [kɔrði] "corddi" *to churn*. Figure 7 shows that variation between the front vowels [e(·)] and [ɛ] is usual in this context in both areas, with the percentages of the close-mid [e(·)] ranging from 49% to 26% in Harlech, and from 54% to 39% in Tywyn. A Chi-squared Test shows that the difference between the two areas is significant (Chi-squared Test with Yates' Correction = χ^2 (1) = 18.787, $p > 0.0001$). In the same way, it is clear from Figure 8 that interchange between the back vowels [o(·)] and [ɔ] is normal in both areas, with the percentages of the close-mid [o(·)] ranging from 44% to 11% in Harlech, and from 52% to 34% in Tywyn. A Chi-squared Test shows that the difference between the two areas is significant in this instance too (Chi-squared Test with Yates' Correction = χ^2 (1) = 27.607, $p > 0.0001$).

Clearly then, the considerable variation shown in Figures 7 and 8 between the close-mid and open-mid variants, i.e. [e(·)] / [o(·)] ~ [ɛ] / [ɔ], contrasts sharply with the stable situations of these vowels in stressed monosyllables, both in long vowels (cf. Figures 1 & 2 above) and short vowels (cf. Figures 5 & 6 above). Indeed, the lack of correlation between the results of short vowels in stressed monosyllables and those of their counterparts in stressed penultimates is striking, and clearly confirms that short vowels do not necessarily behave uniformly across all contexts.

unstressed. Similarly, the type of syllable was not a necessary consideration since short vowels of stressed penultimates always appear in closed syllables.

Figure 7: Short / half long front vowels; stressed penultimates, e.g. [peθa] "pethau" *things* and [dɛχra] "dechrau" *to begin*

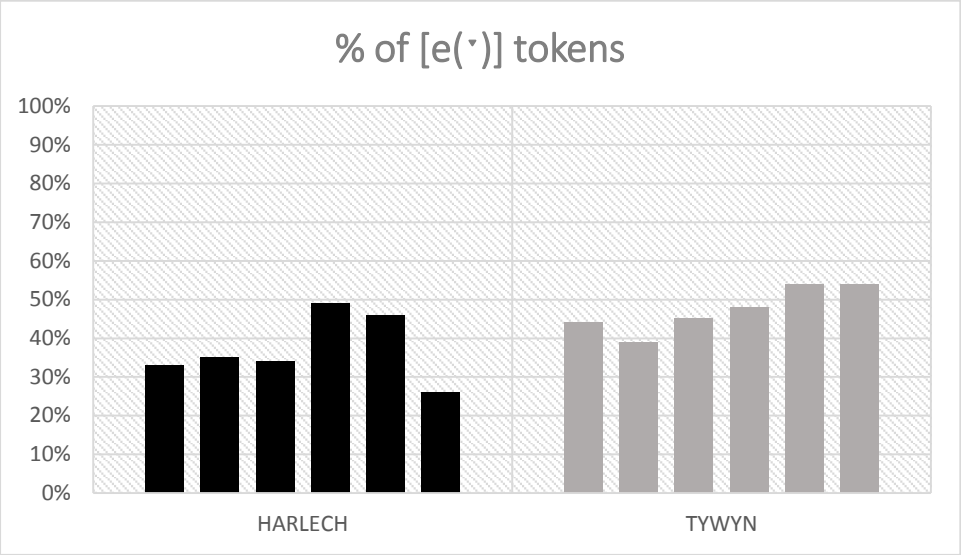
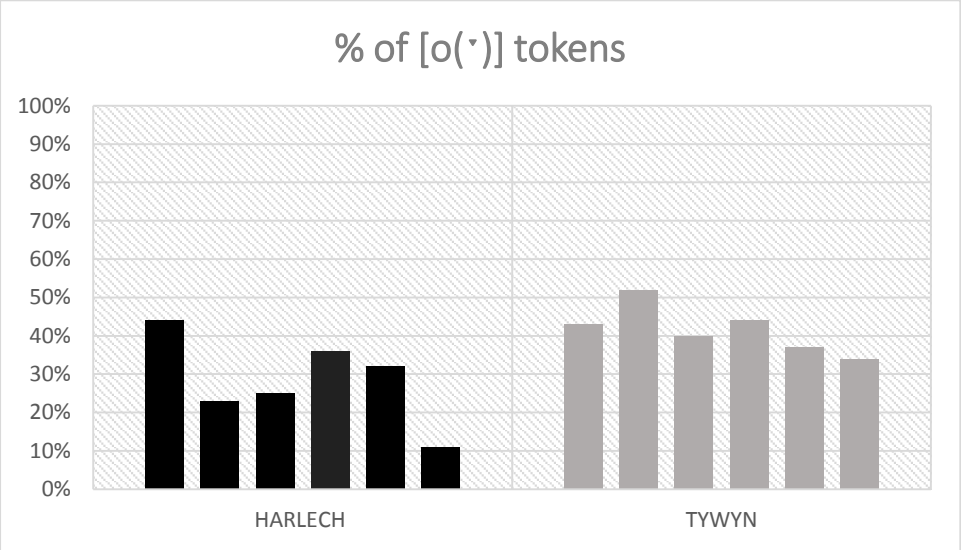


Figure 8: Short / half long back vowels; stressed penultimates, e.g. [hogan] "hogen" *girl* and [kɔrði] "corddi" *to churn*



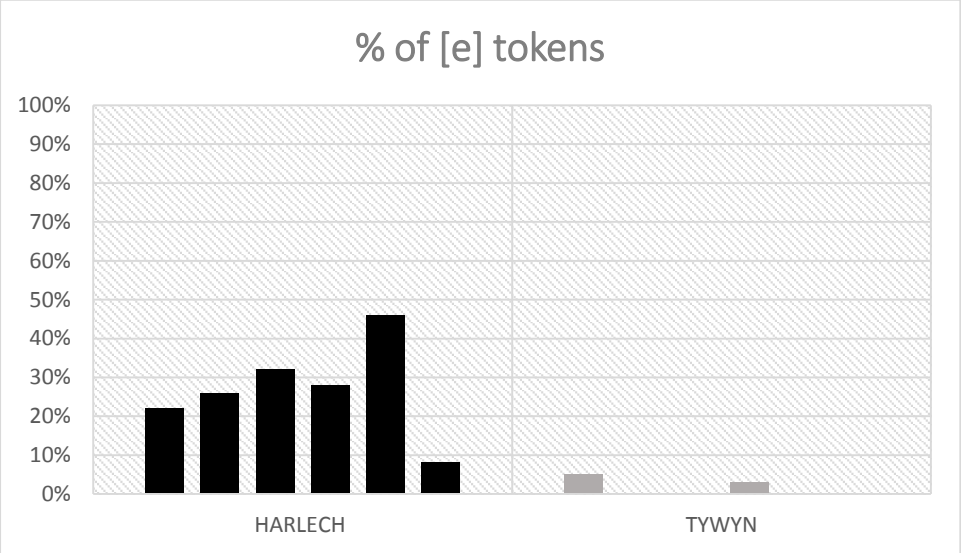
Although it seems from Figures 7 and 8 that the use of the close-mid vowels [e(·)] / [o(·)] are generally slightly higher in Tywyn, it became apparent that the effects of some phonetic contexts on the use of these vowels needed to be probed before a more accurate comparison could be drawn for this context. The relevant data sets for stressed penultimates were therefore divided into two distinct phonetic contexts, namely:

- Vowels preceding consonant clusters only;
- Vowels preceding single consonants only.

4.2.2. Stressed penultimates; vowels preceding clusters only

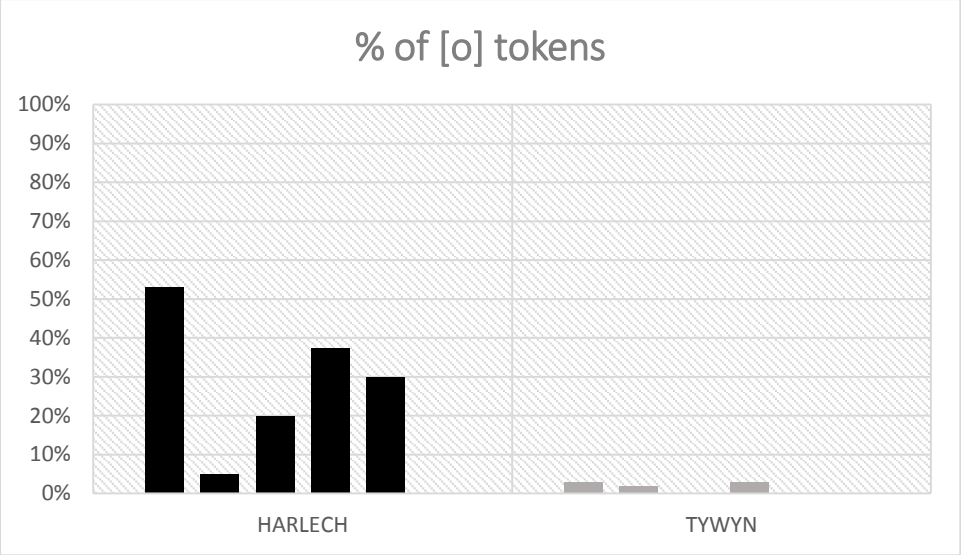
Figures 9 and 10 reflect the situation of front and back vowels respectively when they are followed by consonant clusters, i.e. forms such as [dɛχra] "dechrau" *to begin*, [ɬevrɪθ] "llefrith" *milk*, [kɔrði] "corddi" *to churn* and [kovjɔ] "cofio" *to remember*. These results reveal a strikingly sharp contrast between the two areas. On the one hand, speakers' use of close-mid [e] / [o][43] in Tywyn is almost non-existent, and is limited to some exceptions, e.g. [ɬevrɪθ] by B.R. In Harlech on the other hand, variation between [e] / [o] and [ɛ] / [ɔ] is generally common, although individual speakers vary considerably, with percentages of close-mid articulations ranging from 46% to 8% in front vowels, and from 53% to 0% in back vowels. Fisher's Exact Tests reveal that the differences between the two areas are significant, both in the front vowels (Fisher's Exact, $p < 0.0001$), and in the back vowels (Fisher's Exact, $p < 0.0001$).

Figure 9: Front vowels preceding clusters only; stressed penultimates, e.g. [dɛχra] "dechrau" *to begin* and [ɬevrɪθ] "llefrith" *milk*



[43] There were no instances of half long [e·] / [o·] noted for this phonetic context.

Figure 10: Back vowels preceding clusters only; stressed penultimates, e.g. [kovjɔ] "cofio" *to remember* and [kɔrði] "corddi" *to churn*



4.2.3. Stressed penultimates; vowels preceding single consonants only

Turning finally to examples where the vowels are followed by single consonants only, i.e. forms such as [vɛɬi] "felly" *therefore*, [peθa] "pethau" *things*, [ʃɔpa] "siopau" s*hops* and [hogan] "hogen" *girl*, the results for the front and back vowels are represented by Figures 11 and 12 respectively. These figures show that the percentages of close-mid [e(·)] and [o(·)] are noticeably higher in Tywyn than in Harlech. Chi-squared Tests show that the differences between the two areas are significant, both with regard to the front vowels (Chi-squared Test with Yates' Correction = χ^2 (1) = 111.811, $p > 0.0001$), and in the case of the back vowels (Chi-squared Test with Yates' Correction = χ^2 (1) = 84.825, $p > 0.0001$). It should be emphasised that this result is the reverse of that obtained for the other phonetic context, i.e. vowels that precede consonant clusters, where the percentages of close-mid articulations were significantly higher in Harlech than in Tywyn.[44] Clearly then, it is crucial to consider the influence of different phonetic contexts, i.e. the difference between vowels that precede single consonants and those that precede clusters, when analysing the use of mid vowels in penultimates.

[44] The possible significance of these results will be explored in detail in the conclusions in section 5.

Figure 11: Front vowels preceding single consonants only; stressed penultimate, e.g. [vɛ̝li] "felly" *therefore* and [peθa] "pethau" *things*

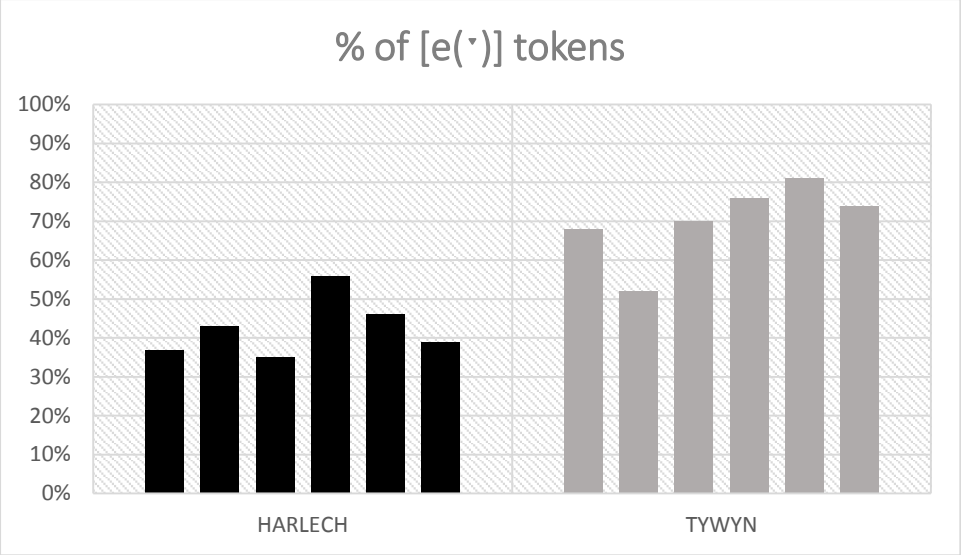
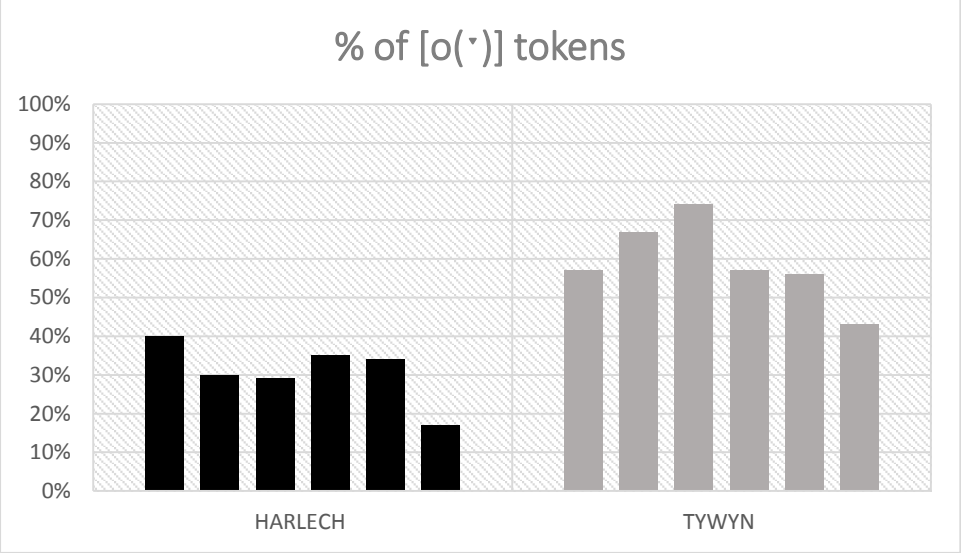


Figure 12: Back vowels preceding single consonants only; stressed penultimate, e.g. [hogan] "hogen" *girl* and [ʃɔpa] "siopau" s*hops*



5. Discussion

The wider implications of the results presented above in section 4 fall into two broad types, and will be presented below in two separate subsections.

5.1. Structural factors

As shown earlier in section 2.2, previous studies of mid vowels in mid-Wales either report that very little quality variation exists as between long and short vowels in various positions (e.g. Sommerfelt 1925), or portray a stable situation where the quality of long and short vowels differs consistently from each other (e.g. R. O. Jones 1967; D. W. Griffiths 1974). However, the data of *The Welsh Dialect Survey* (A. R. Thomas et al. 2000) suggest that quality variation in mid vowels is common throughout mid-Wales, not only as between long and short vowels, but also within specific contexts, particularly in long vowels of monosyllables and short vowels of stressed penultimates. This study is therefore in broad agreement with the picture that we find in *The Welsh Dialect Survey* for mid-Wales generally.

Indeed, in both Harlech and Tywyn, the use (or quality) of the mid vowels in question has been shown to be heavily influenced by a range of linguistic factors, which include:

1. Vowel length – is it long or short?
2. Sentence stress – is the vowel long in a stressed word, or shortened in an unstressed form?
3. The vowel's position within the word, i.e. the syllabic context – does the vowel appear in a monosyllable or a stressed penultimate syllable?
4. The phonetic context in which the vowel appears – specifically in stressed penultimates, is the vowel followed by a single consonant or a consonant cluster?

The prominence of these linguistic factors is consistent with the results that I have obtained previously for other phonological features (Rees 2015: 168–9; Rees 2016: 66–7), namely the high central vowels [ɨ(ː)] / [ɨ], the fronted and raised low vowel [æ(ː)], and the palatalised

velar plosives [kj] / [gj]. The high central vowel [ɨ(ː)] / [ɤ] is in fact the only other phonological feature sensitive to all four of these linguistic factors. The use of the fronted, raised low vowel [æ(ː)] was affected by Factors 1, 2 and 3, and the use of the palatalised plosives [kj] / [gj] conditioned by Factors 3 and 4. However, despite the fact that the same linguistic factors turn up time and again, they do not necessarily have the same impact on different phonological features. Take for instance the fronted and raised low vowel [æ] where it has been shown previously (Rees 2015: 162) with regard to vowel length (Factor 1) that the results of short vowels correlate to a high degree in three different contexts, namely stressed monosyllables, stressed penultimates and final unstressed syllables. Clearly, a comparison of the results of Figures 5–6 and those of Figures 7–12 above unequivocally shows that no such uniformity is seen between short vowels of various contexts in the case of mid vowels. It appears therefore that the impact of these linguistic factors needs to be assessed separately for every single phonological feature, and that it is not possible to establish general principles.

In a similar manner, as was also shown to be the case for other phonological features (Rees 2015: 171–2; Rees 2016: 68–9), it follows from my analysis of mid vowels in Harlech and Tywyn that more traditional approaches to dialect variation are unhelpful in the light of the quantitative results obtained, especially the notion of 'free variation' defined by Petyt (1980: 108) as 'a fluctuation between variants which seems to have no discernible pattern'. Indeed, the results yielded for the front and back mid vowels clearly show that the use of these variables in both areas is once again greatly constrained by specific linguistic factors, and thereby renders the term 'free variation' wholly inadequate. Although this concept is commonly referred to in traditional structural phonemic analyses of Welsh (e.g. C. H. Thomas 1993: 16; Griffiths 1974: XC; G. E. Jones 2000: 5–6), it clearly cannot do justice to the complicated patterns of variation that arise in transition areas such as Harlech and Tywyn, as shown in section 4 above.

Moreover, on the basis of this article's results, it is also clear that neither long nor short vowels can be assumed to behave uniformly across different contexts. For instance, truly long vowels of stressed monosyllables and shortened vowels of unstressed monosyllables (cf. Figures 1–4) have been shown to give very different results in both Harlech and Tywyn. Similarly, as already noted, short vowels of stressed monosyllables (cf. Figures 5 & 6) behave strikingly differently from those in stressed penultimates (cf. Figures 7–12). Clearly,

the influence of vowel length on vowel quality variation should not be investigated in isolation; rather, the complex interaction between vowel length and other potentially crucial linguistic factors such as the vowel's position in the word and the phonetic context should also be explored. Consequently, it may be argued that several general accounts of the phonology of Welsh (e.g. G. E. Jones 1984; Ball & Williams 2001; Awbery 2009; Mayr & Davies 2011; Hannahs 2013) tend to be preoccupied with differences of length, i.e. distinctions between long and short vowels, and that the effects of other relevant linguistic factors have been largely overlooked. This flaw can be attributed partly to the influence of Bloomfield's (1935) classical phonological model whereby the emphasis on phonemes has tended to disregard the significance of any vowel quality variation, especially in the case of Welsh short vowels in stressed penultimates (see, for instance, G. E. Jones 2000: 6).

It is also noteworthy that some differences have been established between the behaviour of the front and back vowels under discussion. For example, the rarity, or even absence of the front open-mid vowel [ɛː] in the stressed monosyllables of both areas (cf. Figure 1), as opposed to the relatively frequent instances of the back open-mid [ɔː] in Harlech (cf. Figure 2), is particularly striking. One possible explanation for this may relate to the fact that the open-to-close-mid front vowel area is relatively crowded in both Harlech and Tywyn. The dialects of these areas differ from other more typically 'northern' varieties of Welsh in that they have an extra front vowel, namely the near-open [æ(ː)]. Vowels which are consistently low in other dialects of Welsh (as well as in the standard language) are fronted and raised in mid-Wales, most commonly in long vowels, and this fronted raised vowel is referred to as the 'slender a' (*yr 'æ fain'* in Welsh) (B. Thomas & P. W. Thomas 1989: 36).[45] Consequently, speakers who use the near-open [æ(ː)] vowel regularly may be resisting a change from close-mid [eː] to open-mid [ɛː], or a merger of both, in order to maximise contrastivity between [eː] and [æː], e.g. in [gweːɬd] "gwellt" *straw* / [gwæːɬd] "gwallt" *hair*,[46] as opposed to a supposed

[45] For a detailed analysis of this phonological feature in mid-Wales, see Rees 2015.

[46] Further fieldwork is required however in order to determine whether the decline in the use of the near-open [æ(ː)] vowel among younger generations in Harlech (Rees 2009: 94–6) coincides with an increasing tendency to employ the open-mid [ɛː] vowel, if not an [eː] / [ɛː] merger in progress.

open-mid [ɛː] / open [aː] contrast, e.g. [gwɛːɬd] “gwellt” / [gwaːɬd] “gwallt”, in non-[æ(ː)] areas such as northern Gwynedd or Anglesey.[47]

5.2. External factors

It is also important to draw attention too to the effects of some external factors, especially the geographical implications of the results presented in section 4 above, bearing in mind that both Tywyn and Harlech are located in a transition zone between north and south Wales. Before looking in detail at the significance of the differences that exist as between the two areas, let us consider whether any social factors may be relevant to speakers’ use of mid vowels in the two areas. First, with regard to the age of the speakers, any striking differences between, say, the eldest and the youngest informants would be observable easily since the order in which the speakers appear in the results of Figures 1–12 above is determined by their date of birth.[48] However, it is clear from these results that individuals from each area do not rank in a similar way for each linguistic context. Consequently, it appears unlikely that age plays any obvious role in the results despite there being considerable interspeaker variation in several contexts.[49] Similarly, gender differences were also considered, but differences between male and female speakers did not appear to be significant generally.

[47] Interestingly, a similar hypothesis involving the concept of crowded vowel space has been put forward by Mayr & Davies (2011: 19) in their attempt to account for generally more open realisations of /eː/ and /oː/ in north(-west) Wales. They propose that ‘[t]he more open realization of /eː/ [in north Wales] is perhaps a result of the relatively crowded high-to-mid front vowel space in this variety’, and suggest also that ‘[p]erhaps, the relatively more open realization of /oː/ in Northern Welsh is a result of vowel height harmonic processes by analogy with /eː/’. The problem with the latter part of this hypothesis in the light of this article’s results however is that it is largely based on the assumption that open variants of both the front and back vowels appear in equal proportions throughout north Wales. Evidently, Figures 1 & 2 above indicate that this is not the case in Harlech. It does not seem plausible therefore to suggest that instances of the back open-mid [ɔː] in Harlech result from ‘vowel height harmonic processes’, as Mayr & Davies put it, simply because of the rarity of the front open-mid vowel [ɛː] in this dialect.

[48] As is shown in Table 5, the age range of informants is wider in Tywyn (14/06/1913–27/04/1951) than in Harlech (11/10/1918–25/01/1934).

[49] This is very different from the situation of the high central vowels [ɨ(ː)] / [ɘ] in Tywyn whereby the levels of these northern variants were generally lower (i.e. across several linguistic contexts) by R.P., who was considerably younger than other speakers in this district (for further details, see Rees 2016: 58–64).

Be that as it may, there can be no doubt that geography is the most pertinent external factor as far as Harlech and Tywyn's usage of mid vowels is concerned. In this respect, let us highlight in the first instance some differences between the two areas which may involve a gradual loss of south-Walian features, starting with monosyllables:

- In Tywyn, speakers' use of the long close-mid [oː] in stressed monosyllables is found to be categorical and consistently high. In Harlech on the other hand, variation between the close-mid [oː] and open-mid [ɔː] is seen by each speaker, with percentages of [oː] tokens ranging from 71% to 92%, as shown in Figure 2 above. No such variation was found in the front vowels [eː] / [ɛː] of stressed monosyllables since the use of the close-mid [eː] was constantly high in both areas, as shown in Figure 1 above.

How should this difference between the two areas be interpreted? One plausible inference of the results is that the discrepancies in the percentages of [oː] between the two areas relate to more general differences between the southern and northern phonological systems. If so, it seems probable that Tywyn aligns itself with the southern vowel system with its constant use of the close-mid [oː], while Harlech's generally lower levels of [oː] seem to suggest that Harlech is less closely aligned. Consequently, the difference between Harlech and Tywyn in this instance appears to indicate that both areas are within a widespread mid-Walian transition zone where typically south-Walian features gradually dissipate as one travels northwards.

Noticeable differences between the two areas were also noted in stressed penultimates. Before looking in detail at vowel quality variation in this context, it is worth stressing the following point regarding penultimate vowel length:

- In Tywyn, sporadic instances of half long vowels, preceding some single consonants only, were noted. In Harlech on the other hand, no such half long vowels were identified in stressed penultimates.

The examples from Tywyn of half long vowels interchanging with short vowels, e.g. [gwe·nar] ~ [gwenar] "Gwener" *Friday* and [ko·di] ~ [kodi] "codi" *to rise*, as opposed to the non-existence of such vowels in Harlech, would seem to indicate that Tywyn once again aligns itself with southern vowel systems to a greater extent than Harlech.[50] However, an absence of any open-mid half long vowels, i.e. [ɛ·] / [ɔ·], by any speaker would suggest that Tywyn has more in common with south-east Wales in terms of the distribution of half long vowels (cf. Table 2 above).

However, before arriving at any final conclusions, a closer examination of the extent to which the penultimate vowel quality variation patterns of both Tywyn and Harlech resemble those of other parts of Wales is necessary. It is therefore important to emphasise the following quantitative difference between the two areas:

- The percentages of the close-mid variants [e(·)] / [o(·)] in Tywyn's penultimates are generally higher than the levels of [e] / [o] in Harlech's penultimates when these vowels are followed by single consonants, as shown in Figures 11 & 12 above

How could this result then relate to the use of mid vowels in other Welsh vowel systems? First, in south-west Wales, as explained in section 2.1, the distribution of mid vowels in the penultimate syllable is governed by the vowel quality of the final unstressed syllable; open-mid [ɛː] / [ɔː], for example, are triggered by high vowels of the final unstressed syllable, e.g. in [tɛːbig] "tebyg" *similar*. Consequently, the numerous examples from Tywyn and Harlech of close-mid vowels appearing in penultimates of forms which have high vowels in their final syllables, e.g. [kodi] "codi" *to rise*, [moχɨn] "mochyn" *pig*, and [enu] "enw" *name*, clearly show that the vowel system of these areas in mid-Wales is essentially different from that of south-west Wales.

In south-east Wales on the other hand, Table 2 above clearly shows that the use of the close-mid vowels [eː] / [oː] in stressed penultimates is not constrained by the vowel quality of the

[50] Following Chambers & Trudgill (1998: 104–18) and Trudgill (1986: 62–5), these half long vowels which are neither long, as in parts of south Wales, nor short, as in north(-west) Wales, may be regarded as 'fudged lects' or 'interdialect' forms (see section 2.2.3. for another example of this phenomenon in another part of mid-Wales).

final unstressed syllable; forms such as [teːbig] “tebyg" *similar* and [eːde] “edau” *thread* are common, for example. It initially appears then that Harlech and Tywyn’s use of [e(·)] / [o(·)] in this context resembles more closely the distribution of these vowels in the traditional Welsh dialects of south-east Wales, even though the close-mid variants of this region are generally synonymous with a consistent use of (half) long vowels (C. H. Thomas 1976: 350–1). However, as noted also by Wmffre (2003: 122) for mid-Wales generally, the distribution of mid vowels in this region is not always similar to that found in south-east Wales. Instances of close-mid [e(·)] / [o(·)] preceding orthographic “nn” / “rr” are found for instance, e.g. [sgrəvenɨ] “ysgrifennu” *to write*, [kjerig] “cerrig” *stones* and [to·ri] “torri” *to break* in Tywyn, as opposed to [sgrivɛnni], [kɛrrig] and [tɔrri] throughout south Wales.

To return to the results, i.e. the quality variation levels of Figures 11 and 12, it may be cautiously be proposed that Tywyn’s generally higher levels of close-mid articulations in this context suggest that the forms of this district resemble those of south-east Wales to a greater extent than those of Harlech.[51] Consequently, it follows that Harlech’s generally lower percentages of [e] / [o] in this context indicate that a tendency to incorporate elements usually associated with traditionally south-eastern forms gradually diminishes (and probably becomes far less marked) as one travels northwards.[52]

However, due to the lack of studies to date of variation in the quality of penultimate vowels in north-west Wales, it cannot be assumed currently that close-mid vowels are wholly absent from other varities in north-west Wales. Further research is therefore required in order to determine the extent to which Harlech aligns itself with other parts of mid-Wales, as well as other parts of north-west Wales, as far as the penultimate vowel system is concerned.

[51] For discussion on further parellelisms between the phonological features of mid-Wales and those of traditional dialects in south-east Wales (*y Wenhwyseg*), see Rees (2013: 471–73).

[52] Interestingly, C. H. Thomas’s (1976: 350) reference to penultimate vowel length variation in the transition area of Dyffryn Wysg (the Vale of Usk) in Breconshire seems to infer that the shortening of vowels always coincides with a change in vowel quality. Doublets such as [sɑ·χɛ] / [saχɛ] are noted, for example. It appears therefore that it may well be worth revisiting the recordings of this transition area in the light of the substantial penultimate vowel quality variation exhibited in this article for the Merionethshire coast.

Further resemblances can be found between the distribution of mid vowels in Tywyn and Harlech, and that of Rhosllannerchrugog in north-east Wales. For example, forms which have close-mid [e(·)] / [o(·)] preceding orthographic "rr", e.g. [to·ri] for "torri", have been attributed to Rhos as well as parts of mid-Wales (including Montgomeryshire) by other dialectologists of Welsh (e.g. Wmffre 2003: 122; B. Thomas & P. W. Thomas 1989: 107), and are considered as 'more recent innovations' by Wmffre. B. Thomas & P. W. Thomas also specify that the quality of mid vowels in Rhos's stressed penultimates is determined by the following vowel height, i.e. that the use of [e] / [o] is confined to forms which have high vowels in their final unstressed syllables, e.g. [arbenig] "arbennig" *special*, [kapelɨð] "capelydd" *chapels*, and [meðul] "meddwl" *to think*.[53] The distribution of mid vowels in Harlech and Tywyn is clearly not identical to that of Rhos as there are several examples in both areas of [e(·)] / [o(·)] in forms which have mid and low vowels in their final syllables, e.g. [gwenar] "Gwener" *Friday* and [nosɔn] "noson" *night*, in addition to forms more typical of Rhos which have high vowels in their final syllables. It therefore seems unlikely that Harlech and Tywyn's use of mid vowels in stressed penultimates is governed by the vowels of the final syllables, and as shown in Table 6 above, the numerous examples of variation within the word, e.g. [evɔ] ~ [ɛvɔ] "efo" *with* and [kjerig] ~ [kɛrig] "cerrig" *stones*, also make it difficult to establish any clear-cut rules regarding the effect of various following consonant segments on these vowels.

Until now, a weakening of typically southern phonological features (or at least elements that resemble those of southern vowel systems) has been a constant pattern.[54] However, a very different set of questions is raised when another striking difference between the two districts is taken aboard, specifically:

[53] Note that B. Thomas & P. W. Thomas do not provide details on the vowel length of these close-mid articulations in Rhos.

[54] Interestingly, this pattern does not appear by any means to be in line with the following analysis of lexical features in mid-Wales by A. R. Thomas (1973: 38): '[…] the midland area as a whole does not appear […] to have a character of a 'transition-area' between north and south. It seems that it would be better described as an area which has a fundamental unity with the north, disturbed more significantly by internal differentiation than by its bilateral links with north and south.'

- The levels of the close-mid vowels [e] / [o] are generally substantially higher in Harlech's penultimates than those of Tywyn when these vowels are followed by consonant clusters, as seen in Figures 9 & 10

It should be stressed here that the rarity of [e] / [o] in this context in Tywyn contrasts sharply with the relatively common occurrences of this feature in Harlech, e.g. in forms such as [kerðad] "cerdded" *to walk*, [ɬevrɪθ] "llefrith" *milk*, [°vedri] "medri" *you are able*, [godrɔ] "godro" *to milk*, [gorfan] "gorffen" *to finish* and [tokja] "tociau" *sand-dunes*. However, since instances of close-mid articulations preceding consonant clusters have never been reported in any other Welsh dialect before, it appears that the results of Figures 9 & 10 raise as many questions as they provide answers. Is the use of the close-mid vowels in this specific context confined to Harlech, for instance? Or could it be a more north-Walian feature that is found over a widespread region in north(-west) Wales, distinct from the vowel systems of south and mid-Wales alike? Certainly, if further research were to reveal that the close-mid variants [e] / [o] are also common in other parts of north(-west) Wales in this specific context, it would then appear plausible to suggest that the striking differences seen in Figures 9 & 10 above between the results of the two areas do not merely involve minor differences in levels of alternations, but rather point to two essentially distinctive phonological structures, i.e. a mid-Walian system and a northern one – the mid vowel system in this specific context at least may well be radically different in these two regions.

6. Conclusions

The new empirical results presented in this article have clearly shown that there is not by any means a clear-cut relationship between length and quality in the Welsh mid vowels of two distinctive areas in mid-Wales, thereby implying that previous accounts of the vowel systems of Welsh (e.g. G. E. Jones 1984; Ball & Williams 2001; Awbery 2009; Mayr & Davies 2011; Hannahs 2013) have been preoccupied with differences of length, and that the effects of other relevant linguistic factors have been largely overlooked. It also follows that it cannot simply be assumed that vowel quality is 'determined' by length; indeed, it could be argued that the prospect of vowel length being influenced by (and indeed varying and changing with) vowel quality has been ignored to a great extent by the authors noted above.[55] Moreover, the significant differences which have emerged between the dialects of the two areas, namely Harlech and Tywyn, have not only been insightful in extending our knowledge of the vowel system in an important but understudied transition zone in mid-Wales, but could also further enhance our understanding of other vowel systems in other parts of Wales. Indeed, the considerable variation seen in Harlech's mid vowels in the case of one specific phonetic context, namely short vowels of stressed penultimates that precede consonant clusters, as opposed to a lack of variation in this context in Tywyn, strongly suggests that a detailed quantitative analysis of the vowel system in parts of north Wales, a region neglected almost entirely by phonologists and phoneticians of Welsh, could reveal more widespread variation than that which has hitherto been reported for this region.

It is hoped that this study will open the field for further research on the complex nature of quantity-quality interactions of Welsh vowels in the near future, including follow-up studies of cross-generational comparisons in the same areas, cross-regional comparisons over wider

[55] Take, for instance, the variation between open mid [ɛ] / [ɔ] and close-mid [e(·)] / [o(·)] in Tywyn's stressed penultimates, within the same words in some cases, e.g. in [gwɛnar] ~ [gwe(·)nar] "Gwener" *Friday* and [kɔdi] ~ [ko(·)di] "codi" *to rise*. It certainly seems likely in this instance that vowel quality variation precedes variation in vowel length, and, as Peter Wynn Thomas has also suggested for traditional dialects in south-east Wales (cf. footnote 7 above), that it is the quality of close-mid articulations which may have given rise to some half-long vowels in mid-Wales. It is also interesting to note that Iosad's (2017: 123) recent study of the Welsh vowel system of south-west Wales concludes that 'quality *must* be represented in the phonology separately from the length [factor]'.

parts of Wales, as well as acoustic measurements of the fine qualities and precise duration of these vowels across various areas and linguistic contexts. This analysis should also be extended to other pairs of vowels, e.g. the high front [i(ː)] / [ɪ], the high central [ɨː] / [ɨ], and the high back [uː] / [ʊ] pairs. Similarly, the influence of more precise phonetic environments, e.g. the extent to which various types of following fricative segments have on the quality of various vowels, could also be probed. Finally, this article may well also have important implications for the field of theoretical phonology, especially in view of the fact that the notion of vowel quality being determined by vowel length is complicated substantially by the quality variation exhibited in the results above.

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