

## Chapter 8

# Rhythm in Maltese English

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There is evidence to suggest that rhythm may be a key element in the identification of Maltese English, MaltE. A number of characteristics at different levels of structure have been noted in research on this variety. These include a number of phonetic and/or phonological features, some of which may combine to trigger the perception of a pronunciation which is identifiably MaltE. Amongst these features, examining aspects of duration and/or timing has been shown to be a worthwhile starting point in understanding the nature of the rhythm of MaltE. Such elements include, but may not be limited to, the preference for full over reduced vowels, the tendency to production of post-vocalic ‘r’, and gemination of consonants (Calleja 1987; Vella 1995; Debrincat 1999; Grech 2015). It has been pointed out in research to date (Arvaniti 2009; 2012; Nokes & Hay 2012), that while durational characteristics cannot be assumed to be entirely responsible for different rhythm patterns, they remain pivotal, together with features including pitch, or intensity, in the perception of patterns of prominence which collectively could be referred to as rhythm. Following previous research by Grech (2015) and Grech & Vella (2015), there are indications that a Pairwise Variability Index (Grabe & Low 2002) can capture aspects of vowel duration and timing which can, in turn, translate into some measure of lesser or greater degrees of identifiability of this variety of English. This paper therefore reports on a study carried out using a normalised Pairwise Variability Index, nPVI, to measure local patterns of variability in vowel duration, as an indicator of rhythm patterns in 6 MaltE speakers. These speakers were rated in an earlier study (Grech 2015) as representing different degrees of identifiability as MaltE speakers on a continuum of variation. The extent of identifiability of these speakers is correlated to the nPVI results obtained in an attempt at addressing the matter of the extent to which rhythm characteristics may trigger listener perceptions of this variety.



## **1 Introduction: Describing a new variety of English**

Native speakers of Maltese English (MalTE) frequently report recognising another MalTE speaker within a few seconds of speech, even if that speech is decontextualised, such as in an online video clip, or at an airport. The speed and certainty with which such instances of recognition are reported hints at predictable and systematically realised characteristics and features of speech at various levels of linguistic structure, but possibly most noticeably, at the phonetic and/or the phonological levels. A recent study, Grech (2015), taps into this intuitive recognition in an attempt at beginning to determine more precisely which phonetic/phonological features may be likely to trigger such perceptions in the first place.

The presence of characteristics and features serving to distinguish this variety from other varieties of English would hardly be considered unusual, given that some form of English, alongside other languages, has been widely used throughout the Maltese islands since the British established a colony there in the early 1800s. However, there has been – and to a large extent there still is – hotly debated discussion surrounding the kind of English that is actually developing, with the ‘complaint tradition’ (Milroy & Milroy 2012) about failing standards, and broadly termed ‘bad’ English frequently being very much at the heart of such debates. Traditionally dismissive attitudes towards the variety of English used in Malta have perhaps until more recently, stymied focused research on variation in MalTE and any of the socially meaningful patterns some of its features and characteristics might present.

The English language first became relevant in Malta in the context of some 200 years of colonial rule, making it the latest in a range of languages adopted alongside Maltese as the island sought to tap into the Mediterranean trade routes and socio-political dynamics (Brincat 2011). Increasingly rooted in Maltese society, English has become established as part of the bilingual reality of the islands’ inhabitants, and as such it can be shaped and moulded to suit different contexts and social situations. It has therefore become increasingly important to be able to recognise the emerging MalTE not simply in relation to an established ‘other’, such as Southern Standard British English, SSBE, closely associated with school models of English, but more pertinently, in relation to the potentially socially meaningful range of variation within the variety itself. With the island’s geopolitical position making it a feasible location for economic migrants, and an inevitable staging-post for refugees fleeing war, poverty and climate change in Africa and the Middle East, MalTE also sometimes takes on the role of a lingua

franca, as new communities seek access to employment, healthcare and schooling. Thusat et al. (2009), Vella (2013), and Camilleri-Grima (2013) all refer to use of English as evident across different strata of Maltese society, and this, together with Bonnici's (2010) in-depth sociolinguistic study of communities where MaltE is the primary means of communication, suggests that this variety is on the cusp of an endonormative stage of development, which Schneider (2003) refers to as 'nativisation'.

A study in Grech (2015) sought to circumvent the more strongly held attitudinal stances towards MaltE by drawing on introspective perception judgments instead. An experimental study with 28 native MaltE listeners judging ten speakers, was designed in such a way as to bypass more overtly held attitudinal positions towards MaltE, and to focus instead on its structure. In each case, the 28 listeners were presented with ten 12-15 second clips involving ten different MaltE speakers. While the speakers were all Maltese, one of the speakers had also lived in England for a few years, and was therefore expected both to have acquired some new features or to have modified some of the expected MaltE features, and to be identified by native MaltE listeners as a little different from the rest of the cohort. The remaining speakers were all Maltese, having grown up, been schooled and then established themselves in Malta. Nevertheless, they also displayed different degrees of linguistic variation, due to a number of social and linguistic factors widely recognised as having an impact on language usage in Malta, such as type of schooling, social background, or peer group identity (Vella 2013; Camilleri-Grima 2013). The recorded clips prepared were extracted from longer conversations and tasks designed to generate a similar range and type of lexis and use of language across speakers. All the clips contained phonetic/phonological features which an earlier study (Grech 2015) had identified as relevant to the identification of MaltE.

It is important to recognise that MaltE is not a homogenous entity, but in fact also presents variation within the variety, what Mori (forthcoming) refers to as a "continuum of continua". Findings in Grech (2015) echo aspects of earlier research on the variety of English used in Malta to suggest that variation can be found at all levels of linguistic analysis. However, it is also suggested (see also Vella 1995; Bonnici 2010) that while variation at the phonetic/phonological levels is likely to cut across different social groups and linguistic backgrounds, variation at other levels is likely to be more contained within a particular subgroup of the variety. In particular, Bonnici (2010) found this to be the case with respect to the question of rhoticity. She suggests that earlier generations may have aimed at a less rhotic variety in a semi-conscious effort to emulate perceived standards of

correctness in relation to SSBE, possibly also an impression which might have been transmitted through schooling. Conversely, younger generations may be adopting a more rhotic accent in an effort to distance themselves precisely from too close an association with this variety. Figure 1 below describes a possible schema for some of the characteristics which have featured most prominently in research on MalTE. Those features related to phonetics/phonology have so far been reported to be the ones most likely to be present to some extent across all varieties of MalTE (Vella 1995); by contrast features in other domains, such as pragmatic features, for example, may be drawn on in more specific or restricted contexts.

	Syntax/Morphology	Semantics/Lexicon	Pragmatics
Different features can be present to varying degrees including not at all	Pronoun copying	<i>even I</i> ('me too')	Complimentation
	Sentence final <i>but</i>	<i>pocket</i> ('pencil case')	Discourse markers <i>mela, ta</i>
	Topicalisation/fronting	<i>slipper</i> ('running shoes')	Phatic communication
	Variant use of modals	<i>stay+ing</i> (continuity)	Politeness strategies
	Variant question formation	periphrastic <i>of</i> for possession	Register (formal, careful vs. casual speech)
...	...	...	...
Usually present to some degree even in the absence of other features	Segmental features such as neutralization or variant pronunciation of /θ/-/ð/ contrast, absence of dark 'l', pronunciation of /ŋ/ in <i>ing</i> as [ŋg]		
	Features such as vowel quality and duration, rhoticity, consonant gemination		
	Reflex of the above on rhythmic characteristics		
	Idiosyncratic stress patterns		
	Idiosyncratic intonation		
	Phonology/Phonetics		

Figure 1: Two dimensions of variation in MalTE

We can therefore consider the notion of MalTE as one which operates more on a continuum of variation, particularly in the case of phonetic and phonological features which may serve to identify the speaker to a greater or lesser extent as a speaker of MalTE as opposed to as a speaker of some other variety of English. This view takes its cue from the notion of a 'cline' proposed in earlier sociolinguistic accounts of world varieties of English (Braj 1992: 57), where the different functional uses of English in a given community may generate variation within that particular variety of English. For MalTE, Borg (1980: 4) also makes reference

to the presence of such intra-variety variation in the English used in Malta when he talks of ‘gradation’ of usage across different social strata (but again, see also Mori, forthcoming).

In this respect, one of the richest levels of linguistics to yield evidence of variation which both distinguishes MaltE from other varieties, and also distinguishes individual MaltE speakers from each other, involves the phonetic/phonological. The rest of this chapter reports on a study investigating durational characteristics in MaltE, using the so-called Pairwise Variability Index (Grabe & Low 2002), as a means of measuring variation in the rhythm of MaltE. §2 presents the background to the study, beginning with an overview of rhythm and its measurement, and continuing with a brief investigation of other structural features evident in MaltE which are likely to influence the overall perception of rhythm. The methodology and design of the experimental study are presented in §3, while §4 describes the findings and preliminary indications for further study to be carried out as we move in the direction of a more comprehensive description of MaltE.

## 2 Rhythm and durational characteristics

### 2.1 Rhythm and its measurement

When attempting to identify characteristic features of the speech of a newly emerging language variety such as MaltE, an approach accounting for both the localised, physical events of speech as well as their “symbolic value” (Ladd 2011: 348) is crucial to a more holistic understanding of the variety. Thus, the actual phonetic realisation of phonemic categories, and the abstract phonemic categories themselves both require investigation. The study of variation in rhythm presents itself as an ideal domain for combining a phonetic analysis with a phonological one. The combined approach advocated here and highlighted in Ladd (2011) assumes an understanding of the relationship between phonetics and phonology as being two related facets of the same broad area of study. Rhythm may be one of those domains where it is useful to keep in mind this constant interplay of phonetics and phonology.

The study of rhythm has seen a good deal of progress especially concerning the relationship between the occurrence of specific and measurable linguistic elements in context on the one hand, and the more abstract global characterisation that such linguistic elements might come to symbolise in listener perception on the other. Studies in the area of linguistic rhythm have investigated the connection between the phonetic realisation of duration and timing, for example, along-

side the broader phonological classification of languages into “stress-timed” or “syllable-timed” languages, as originally proposed by Abercrombie in 1967.

Rhythm has been described recently by Nokes & Hay (2012) as “the patterning of prominent elements in spoken language, as perceived by the listener” (2012: 1). Besides providing a succinct description of the essence of rhythm in language, this definition also focuses on the notion that understanding rhythm is as much about understanding listeners’ perceptions of the patterns of prominent and non-prominent elements, as it is about these elements themselves.

Traditionally, definitions of different rhythm patterns across languages are credited to Pike (1945) and Abercrombie (1967: 96) who first presented the notion that languages could be typologically distinguished on the basis of their rhythm patterns. Since then, this view has gone full circle from being gradually debunked, to being more recently partly restored in modified form. The original views expressed by Pike and by Abercrombie resulted in the division of languages into “syllable-timed” or “stress-timed” according to whether all syllables, stressed or unstressed, are produced with more or less even timing (syllable-timed) or whether timing is organised primarily around stressed syllables, with any intervening syllables being modified through reduction or weakening as compensation (stress-timed). Abercrombie (1967: 97) also described rhythm in terms which suggest an observable activity complete with corresponding physiological correlates as “Speech rhythm is essentially a muscular rhythm”. Although this suggests that rhythm is essentially something that a speaker produces, Abercrombie also goes on to give a surprisingly prescient suggestion that the notion of rhythm might be better typified if viewed in terms of a combined understanding between the speaker and listener “empathetically” in tune with one another, where, if the speaker/listener pair does not share the same mother tongue, “the sounds will not be recognized as accurate clues to the movements that produce them” (Abercrombie 1967: 97).

This hint of a linguistic element not being exclusively governed by a speaker’s output is echoed years later by Roach, who observes that “the distinction between stress-timed and syllable-timed languages may rest entirely on perceptual skills acquired through training” (Roach 1982: 73). The underlying belief, up to the 1990s, remained that perhaps rhythm was best studied within the domain of perception. Nokes and Hay in fact quote Beckman (1992) who refers to the attempts to capture rhythm patterns as “one of the most persistent metaphors in the history of our struggle to understand speech rhythms” (2012: 3). The word ‘metaphor’ might give an indication as to why some linguists have preferred to treat rhythm as a perceptual phenomenon, rather than as an objectively measur-

able one in temporal terms. Couper-Kuhlen (1986), for example, takes this route while noting that “it is a natural human tendency to impose structure on perceptual stimuli” (1986: 52).

Nevertheless, Roach also hints at another route to understanding rhythm better when he suggests that “there is no language which is totally syllable-timed or totally stress-timed” (1982: 79). This latter perspective involving a continuum, rather than mutually exclusive categorisation, also encouraged subsequent research into the domain of phonetic, as well as phonological, interpretations of rhythm, where discrete events such as pitch change, or the durational features of different segments, for example, could be measured and correlated with the perceptions of rhythm being more or less syllable- or stress-timed.

The assumption is then that identifying how prominent elements are ordered in speech (Nespor et al. 2011) will yield information about the rhythm as it is perceived. This at last, allows at once for both a broader, and also a more refined understanding of rhythm. Rhythm is accounted for at its most generic as patterned sequences of prominent and non-prominent elements, with prominence here not necessarily being defined any further. Alternatively, we can try to identify some or all of those elements considered to generate a perception of prominence, and isolate them to study their behaviour further. Nokes & Hay (2012) did just that in their real-time study of the duration of segments in New Zealand English. As the authors describe it, New Zealand English is understood to be more syllable-timed than other varieties of English, and further, this current observation is seen as a shift from earlier rhythm patterns, observed to have been much more stress-timed.

A series of studies now widely regarded as pivotal in trying to capture the acoustic correlates of rhythm manifested in durational characteristics are reported on in Grabe & Low (2002) and Low et al. (2000). The analyses in these papers are based on a formula developed to calculate the durational variability of successive pairs of phonological units. In these studies, in order to account for differing speech rates across individual speakers, a version of the Pairwise Variability Index (PVI) referred to as the normalised Pairwise Variability Index (nPVI) was used when measurements of vocalic and intervocalic intervals were carried out. nPVI analyses of a number of languages including both those identified as syllable- or stress-timed and those hitherto unclassified were carried out resulting in the pegging of these languages to different points on the continuum of stress- and syllable-timed languages. The emphasis here is on durational features, in response to the notion that the perception of rhythm can be correlated to a series of measurable events. In this case, the measurable events are succes-

sive pairs of intervals either vocalic – and therefore syllabic – or intervocalic, which, while not syllabic, may still affect perceptions of duration. If successive pairs of vowel duration measurements vary considerably, then the resulting index will be higher than if vowel duration is more uniform. A language variety like SSBE, for example, with its notable tendency to having weak or reduced vowels in unstressed positions, contrasted with full vowels, long vowels or diphthongs in stressed syllables, could be expected to have a high nPVI index of variability. Conversely, a language such as Maltese, which is normally said to be a language which does not tend to weaken or reduce vowels in unstressed positions (Borg & Azzopardi-Alexander 1997; Azzopardi 1981) might have a lower nPVI index, also indicating that the variability in duration across successive vowels is not as high as it might be in SSBE.

Other contemporary studies measuring different aspects of duration and timing have produced similar results. Ramus et al. (1999: 265) measured vowel and consonant intervals, based on the premise that “the measurements suggest that intuitive rhythm types reflect specific phonological properties, which in turn are signaled by the acoustic/phonetic properties of speech”. Dellwo (2006) presented a method called Varco $\Delta$ C to account for between-language fluctuations in speech tempo, due, in part, to the different syllable structure and phonotactic patterns typical across languages. The measures and acoustic correlates introduced by Ramus et al. (1999) or by Dellwo (2006) aimed to capture ways in which durational features might have a bearing on the perception of rhythm patterns. The formula for a Pairwise Variability Index, normalised to account for differences in speech rate across speakers, the nPVI described above and adopted in Grabe & Low (2002), and Low et al. (2000), also gave the added dimension of capturing localised variability between pairs of vocalic or intervocalic intervals. Durational characteristics of segments are often considered a strong indicator of some form of prominence, and the ordering of such prominent elements in relation to non-prominent ones may lead to a perception of different rhythm as Nokes & Hay (2012: 4) note: “Other factors held equal, a longer vowel length will give rise to a percept of syllable stress, and thus rhythmic prominence, in English”.

## **2.2 Durational features in Maltese English**

The relevance of taking note of durational factors as a ‘marked’ characteristic of MaltE has often been foregrounded in the literature, as well as anecdotally, and here we return to the idea that essentially, our mental image of what rhythm captures, can be described as the ordering of prominent and non-prominent elements in the flow of a person’s speech. In the case of MaltE, the issue of the du-



ration of segments may be seen as one type of realisation of prominence, though clearly not the only one. But certainly, it can be considered a good angle from which to begin examining the concept of rhythm in this variety of English. It is of course quite likely that prominence is variously realised by a range of elements and that these together combine to create certain effects in speech. In other words, the study of rhythm in a given variety may well only begin to come together once different phonetic/phonological features have been analysed, and then eventually examined in relation to each other.

Although research on MaltE to date has not often focused overtly on rhythm, there are repeated, even if only oblique references to features which have durational characteristics embedded in them. Descriptions relating to the phonemic inventory of MaltE are relevant to this research (for example, (Vella 1995; Debrincat 1999; Bonnici 2010). Vella (1995: 74) concludes that: “The M[alt]E vowels differ from their R[ceived] J[P[ronunciation]] equivalents in terms of their quality since they tend to approximate to the quality of corresponding vowels in the Maltese system.” Azzopardi (1981) presents a comprehensive description of the vowel inventory of Maltese. Amongst other conclusions, she notes patterns of vowel duration that may have a bearing on similar patterns in MaltE. Although the issue of possible transfer of Maltese as L1 onto MaltE is not considered further here it is still worth bearing in mind Azzopardi’s conclusion that in Maltese, “Vowels in unstressed syllables are as long and sometimes longer than vowels in stressed syllables” (Azzopardi 1981: 120).

Particular attention is given to schwa, both in its own right as a vowel not readily found in MaltE, but also, with regards to its pivotal role in the rhythm patterns of SSBE and other major and widely codified varieties (see e.g. Deterding 2001). Giegerich (1992) suggests that the vowel schwa does not constitute part of the phonemic inventory of English (variety unspecified), as it is not in contrast with any other vowel, but rather, is a popular option for reduction in weak-stressed syllables. Roach (2009: 102) also comments that “ə is not a phoneme of English, but is an allophone of several different vowel phonemes when those phonemes occur in an unstressed syllable”. Schwa is also not part of the phonemic inventory of Maltese (Azzopardi 1981; Borg & Azzopardi-Alexander 1997). Calleja (1987: 90) notes that her MaltE speakers “make minimal use of vowel reduction and of weak forms”.

Not enough research has as yet been carried out on natural speech data in Maltese for it to be possible to assert that schwa is never present in the language. This is in fact even more so for MaltE. However, given its potentially questionable status as a phoneme both in English as an idealised or prototypical unspecified

variety, and more definitely, in Maltese, it may be expected that spoken MaltE is likely to show a preference for full vowels and less evidence of schwa. As Vella (1995: 75) notes: “The fact that /ə/ is rarely realised in M[alt]E) can therefore be hypothesized to be an important factor in the different rhythmic quality of M[alt]E as compared to that of R[ceived]P[ronunciation]”. Debrincat (1999: 70) further describes how 48.5% of her samples of MaltE speech did not contain evidence of schwa, which she took as “a clear indication of the fact that [the relative infrequency of] /ə/ is probably a contributing factor to the accent of M[alt]E speakers”.

There is a healthy body of previous research both on MaltE and on other varieties of English that encourages a closer look at aspects of the durational characteristics of MaltE which may combine to generate a perception of variation in the rhythmic characteristics of this variety. §3 below describes the study carried out. Data from six speakers of MaltE were analysed. An earlier perception study (Grech 2015) had served to locate the six speakers on a continuum ranging from highly identifiable as Maltese people speaking in English, through to not at all identifiably Maltese.

### **3 Methodology**

#### **3.1 Speaker data**

Both Vella (1995), and Bonnici (2010) point towards a distribution of phonetic variation as a function of specific registers or contexts and this could only be adequately analysed in more natural speech. At the same time, a durational analysis of vowels across different speakers using the formula described in §2.1 above requires directly comparable data. It was considered useful, therefore, to record speakers performing a series of tasks ranging from reading scripted text aloud (these data were labelled as “TextAloud” in the study), to speaking more spontaneously. Only the data from the scripted text is considered for the nPVI analysis here given the requirement of speech involving directly comparable data which would allow comparison of the realisation of aspects of duration by different MaltE speakers. Variability in the reduction or non-reduction of full vowels to schwa nevertheless also draws on and is informed by the analysis of the data involving samples of more spontaneous speech. It has been noted that the context and register of natural speech in MaltE may well trigger slightly different speech styles, which may in turn affect aspects of duration and rhythm Vella (1995). Thus while the study of both inter-and intra-speaker variability in vowel durations is

necessarily restricted to directly comparable scripted texts, the study of schwa adds another dimension to the question of vowel duration in MalTE across different registers. The directly comparable scripted text (TextAloud) gave participants the opportunity to do a careful reading, and may also have triggered an echo of drilled pronunciation practice from earlier schooldays. On the other hand, the more spontaneous speech data elicited as participants were focused on a range of tasks was expected to yield more naturalistic – and therefore, presumably, less carefully monitored – speech.

Six speakers, three male and three female, were recorded in settings familiar to them, using a Tascam DR-100DKII 24bit palm-held digital recorder. The speakers were identified as Maltese, having been brought up and schooled in Malta, and were aged between 38 and 65 years old. One of the speakers, Sp6, had the same background and linguistic profile as the others, but had also lived in England for 4 years. It was expected that she would present some features more closely associated with the SSBE variety, having been directly exposed to this while in England, but it was considered important to include her contribution, in order to evaluate listener responses, as well as corresponding nPVI indices. In particular, greater variability across vowel durations was expected for this speaker.

### 3.2 Data collection and analysis

The same theme, subject matter, and therefore lexis, were retained across all speaking tasks, and centred around an Information Gap type of activity commonly used in communicative language teaching classes. Information Gap speaking tasks are typically devised in order to simulate the need to communicate, but at the same time, they also serve to distract participants (or learners, in a class) from worrying about being observed. The HCRC Map Task (Anderson et al. 1991) is one such activity which was devised specifically for this purpose. The tasks tend to be engaging so that participants become more focused on successfully managing and completing the task at hand, rather than worrying about the fact that they are being recorded (or observed in a class).

The key Information Gap activity around which all other tasks were centred here took the shape of the familiar childhood game ‘Spot the Difference’, with the information gap generated by a task where two speakers worked as a pair. Each speaker was given a different version of a picture and instructed to identify six differences between the two pictures. The other related tasks involved using the same lexis provided by the activity to describe each picture in full, to frame in sentences, and finally, to read out loud in a descriptive story format. The latter task was coded as ‘TextAloud’ in the analysis, and was used to carry out an

nPVI analysis. All the other data were coded according to their task format as ‘Difference’ for the Spot the Difference activity, ‘Sentences’, in which speakers were recorded saying sentences using the same target words generated in the Spot the Difference activity, and finally ‘Description’, where speakers were asked to simply describe the picture in front of them. Across the text types, all vowels including instances of ‘schwa’ where this could be expected in a weak stressed position were measured and analysed.

The nPVI analysis was based on the formula established originally in Grabe & Low (2002). The present study also incorporated Nokes & Hay (2012)’s modification to measure individual segments rather than vocalic or intervocalic intervals. In the current study, vowel duration was used to capture the aspect of timing in rhythm. Therefore the nPVI formula was applied to measure the duration of each vowel, together with the difference in duration between each successive vowel pair. The final index of durational variability across all vowels was then calculated from an average of all the differences between the successive vowel durations in each speaker’s TextAloud data. A high index indicates more variability across pairs of vowels, while a low index indicates less variability. TextAloud transcriptions for the six speakers were extracted, tabulated in Excel and sorted into vowel segments as shown below in Table 1. The table illustrates an example of the itemisation of each word recorded, as in this case, Speaker 2 read the scripted text out loud. Table 1 shows the vowel segment of each word (or segments if the word is multisyllabic, as in *cartoon*) together with its duration measured in milliseconds. The final column presents a normalised PVI, computed as the absolute value of the difference in duration between each pair of vowels, divided by the mean duration of each pair.

The final index (shown in Table 2) is then calculated as the average of all the differences measured for each speaker, resulting finally, in an index for each of the six speakers. This entire calculation is referred to as nPVI. Note here that Grabe and Low’s vocalic intervals are replaced by individual vowel segments. In the original Grabe & Low (2002) study, a vocalic interval is measured from the onset of the first vowel to the offset of the last one, thus in *the arched handlebars*, /ɪ/ or /ə/ in *the* together with the following /ɑ:/ in *arched* would be measured as one interval together. Since we are interested in vowel durations as a possible indicator of rhythm, we have followed Nokes & Hay (2012), in measuring vowels as segments, rather than as vocalic intervals. The results therefore describe the durations of vowels in the six different MaltE speakers, whilst also giving an indication of any variability in vowel length that may or may not be immediately evident.

Table 1: Sample, extract from Sp(eaker) 2 vowel segment analysis using nPVI

Speaker/Location	Word	Segment	Segment Duration (ms)	nPVI (normalised)
Sp2_TextAloudpvi_textgrid	This	i	59	
Sp2_TextAloudpvi_textgrid	is	i	45	0.27
Sp2_TextAloudpvi_textgrid	a	a	58	0.25
Sp2_TextAloudpvi_textgrid	cartoon	a	49	0.17
Sp2_TextAloudpvi_textgrid	cartoon	oo	157	1.05
Sp2_TextAloudpvi_textgrid	of	o	55	0.96

#### 4 Results: Variability in vowel segments in Maltese English

The results of the nPVI analysis measuring variation in the duration of successive vowel segments are given in Table 2. The results indicate a high degree of variability in vowel duration patterns in Sp6, expressed as the highest index, while Sp1, Sp2 and Sp3 have a comparatively much lower index, indicating much less variability in duration across successive pairs of vowels.

Table 2: Normalised Pairwise Variability Index (nPVI) for 6 MalTE speakers ranked in order of increasing nPVI value

Speaker	nPVI
Sp3 – male	49.5
Sp1 – male	55.1
Sp2 – female	56.8
Sp4 – male	57.9
Sp5 – female	69.7
Sp6 – female	81.1

The index range across the six speakers is particularly remarkable considering they can all, to different extents, be considered to be speakers of the same variety of English (although see comment on Sp6, below). The resulting indices give

a clear picture of the extent to which vowel duration patterns vary across the six speakers. There is a particularly large difference between Sp3 with an index of 49.5 compared with Sp6, with an index of 81.1. For comparison, Nokes & Hay (2012) obtained roughly the same range of index, from 51.5 to 82.5 (Nokes & Hay 2012: 11), with the higher indices corresponding to earlier recordings, and the lower indices corresponding to more recent recordings over 120 years, during which time, New Zealand English was coming to be perceived as more syllable-timed<sup>1</sup>. Although it is to be noted that nPVI results across different participant cohorts producing different texts cannot be directly compared, the pattern of results is still nevertheless informative. This present study, together with the first comprehensive study in Grabe & Low (2002), followed later by Nokes and Hay's (2012) reinterpretation all yield a picture of a clear continuum of variation in the realisation of vowel durations. In all cases, the higher the index, the closer the association with the traditional perception of "stress-timed" rhythm. Conversely, a lower index is associated with a perception of "syllable-timed" rhythm. On Grabe & Low (2002)'s scale, for example, Spanish, an example of a purportedly syllable-timed language, obtained an index of 29.7, compared with a much higher index of 57.2 for English, an example of a stress-timed language. In the present study, variation in the extent to which vowel durations differ within speakers is evident in the six speakers chosen as examples of different points on the continuum of variation in MalTE (see Figure 1). In Figure 2, Speakers 1 to 6 have been ordered according to the perception ratings they received when judged in the listening task by the 28 native MalTE speaker-listeners in the earlier study (Grech 2015). Accordingly, Sp1 was perceived as highly identifiably Maltese by 89% of native MalTE listeners while Sp6 was perceived as identifiably Maltese by only 4% of the participants, and thus was considered the least identifiable amongst the MalTE speakers studied. Notably, Sp6 is the speaker marked as the potential outlier, having lived for some time in England, and for whom features of vowel duration were expected to pattern differently as compared to those of the rest of the participant cohort. Sp2 and Sp3 were also highly identifiable as Maltese, while Sp4 and Sp5 were judged to be moderately identifiable.

Confirming the visible correspondence evident in Figure 2, Pearson's correlation indicates a significant negative correlation -0.883, ( $p$  value = 0.02) for identifiability and nPVI. Those speakers rated as highly identifiable have a correspond-

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<sup>1</sup>Grabe & Low (2002) also obtained similar ranges of indices, this time in a synchronic study of normalised PVI of vocalic intervals in 18 different languages. The languages examined included English, German and Dutch, perceived as stress-timed languages, as well as Spanish, considered syllable-timed, and Polish, considered rhythmically mixed (Grabe & Low 2002).

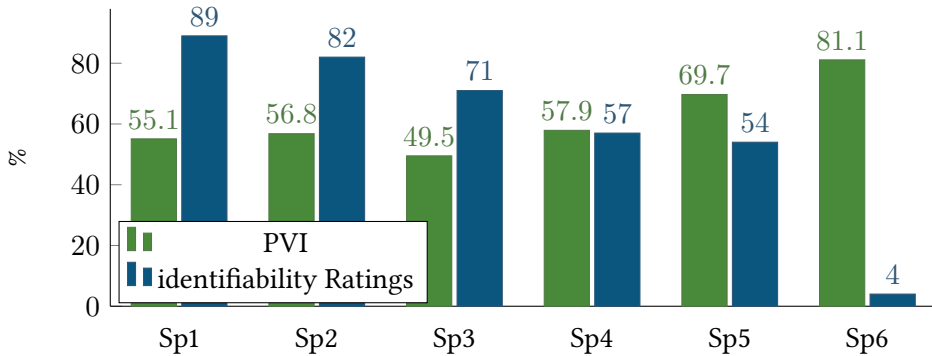


Figure 2: Vowel duration patterns and identifiability judgments for 6 MalTE speakers

ingly relatively low variability index. Sp6, rated as not identifiably Maltese, had the highest variability index, whilst the two moderately identifiable MalTE speakers also presented a relatively low variability index, though not as low as that for the most identifiable speakers.

Further investigation of the vowel durational patterns of each of the six MalTE speakers' extent of the use of the schwa vowel yields a correspondingly predictable pattern. Figure 3 presents the proportion of full vowels preferred over schwa, across all instances where schwa was possible, for each speaker.



Figure 3: Percentage (%) of full vowels in words where schwa could be expected in 6 MalTE speakers

As the figure illustrates, the most highly identifiable MalTE speakers show a strong preference for using full vowels where schwa could have been used. Conversely, Sp6, rated the least identifiably MalTE speaker, had very few instances

of full vowels, showing, instead, a preference for schwa. Pearson's correlation indicated a significant correlation between highly identifiable MaltE and a preference for full vowels over weakened ones. Analysis returned a positive correlation 0.857157 ( $p$  value = 0.03) for highly identifiable MaltE and preference for full vowels. These results provide further support to the idea that the variability index yielded by the nPVI analysis, which is itself designed to test variability in vowel duration patterns, may be a useful way to approach the matter of trying to identify features and characteristics more likely to trigger the perception of a MaltE accent in a speaker.

Further analysis of the preference for full vowels over schwa across different speech styles (spontaneous and more natural speech vs. scripted and more careful speech) also yields a potential indication of endonormative variation in MaltE (see more on this below). Figure 4 illustrates the proportion of vowels realised as full vowels rather than as schwa in the scripted TextAloud, compared with those in spontaneous speech, by speaker.

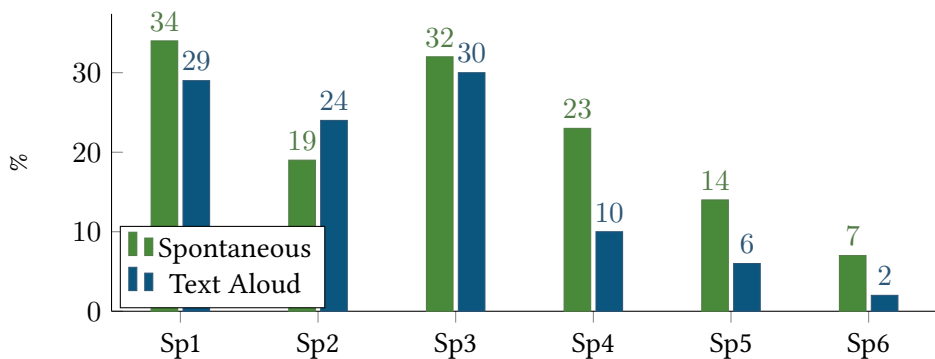


Figure 4: Percentage (%) of full vowels in words where schwa could be expected in two different speech styles

The data shown in this figure confirm that the first three speakers, also rated most identifiably MaltE, have a preference for full vowels over schwa, although the proportion of full vowels is sometimes higher in the spontaneous speech styles. The consistent distinction between the greater preference for full vowels over reduced ones in spontaneous speech could be seen as an indicator of trends of change in the variety of MaltE. While this needs further investigation, it is reasonable to suggest that scripted text triggers learnt patterns typical of those encouraged in a school environment, where undoubtedly standardised versions of SSBE may have been the ones modelled, or at least, aspired to. Conversely,



spontaneous speech might be seen to capture speech patterns which undergo less self-monitoring, and therefore, potentially, are a more robust indicator of how this dialect is likely to change over time.

Interestingly, the same pattern is also observed in the remaining speakers, who are all rated as less identifiably MalTE. Again, the least identifiably MalTE speaker, Sp6 shows a clear preference for schwa over full vowels, while the moderately identifiable MalTE speakers, Sp4 and Sp5, show moderate preference for full vowels, but much less so than Sp1, Sp2 and Sp3. However, all 3 less identifiably MalTE speakers still show a greater preference for full vowels over reduced ones in spontaneous, compared with scripted speech. This is interpreted here as an indicator of MalTE starting to shape its own norms, rather than looking to other more established dialects for doing this.

## 5 Conclusion

There is considerably less variability in the duration of successive vowels as measured by the nPVI amongst speakers more readily identified as being Maltese based on their MalTE accent. A corresponding pattern of slightly greater variability in the duration of successive vowels, again as measured by the nPVI, is seen in those speakers still identified as being Maltese, but who are considered more moderately typical of a Maltese person speaking in English. Conversely, Sp6, the speaker expected to have some features of SSBE, having lived in the UK for some time, and only considered minimally identifiable by 4% of the 28 native MalTE speaker-listeners, showed a marked preference for vowel reduction and vowel weakening and consequently a higher nPVI reflecting the highly variable nature of durations in the successive vowels for this speaker.

The combined effect of more or less variability in the duration of successive vowel segments over longer stretches of speech may in turn lead to a perception of different rhythm patterns. This may be especially noticeable at the extreme ends of the index range, where one speaker presents a high index of variability and another speaker presents a much lower one. However it is also noticeable that the 3 most identifiably Maltese speakers cluster within the lower end of the index, while the moderately identifiable speakers display higher indices, but still not approaching the highest index obtained by the speaker who is least identifiable as a MalTE speaker. On the one hand, therefore, the nPVI can be interpreted in relation to how the indices cluster around 3 main points, ranging from little variability to high variability. On the other hand, the nPVI may also serve to refine the broad categories to capture more subtle distinctions between one

speaker and the other, including among those who might be described as using a more-or-less “syllable-timed” as compared to a “stress-timed” rhythm. Therefore within these broad categorisations, it can be suggested that the nPVI could be used as a means to identify further variation. This interplay between broad categorisation and within-category variation may be a useful feature to capture in the exploration of emergent varieties of languages.

A key observation which emerges from these results is that they can be seen to provide evidence of variation within the variety, suggesting a shift towards endonormative stabilisation. Native listeners can establish when somebody is or is not using MaltE, but they can also distinguish variation within MaltE. The high degree of negative correlation between different listener ratings for MaltE identifiability, and indices of variability in the duration of successive vowels suggests that this feature is a strong indicator of MaltE as a distinct variety, as well as of variation within MaltE. Results show that a low index representing less variability in vowel duration as measured by the nPVI correlates with a highly identifiable MaltE speaker, a midway index correlates with a moderately identifiable MaltE speaker, while a high index indicating a strong degree of variability is linked with a speaker not readily identifiable as MaltE. Predictably, the schwa feature across these same speakers also yielded evidence of variation to echo the nPVI findings, in that the highly identifiable MaltE speakers (Sp1, Sp2, Sp3) made significantly less use of schwa across all speech styles, while the least identifiable MaltE had more widespread use of schwa. Further indications that variability in the use of schwa and vowel duration more generally may also be a function of different speech styles also emerge from the analysis. It is worth noting that this is not a case of categorical presence or absence. Rather, there is evidence of both intra-speaker variation, as well as inter-speaker variation. All speakers exhibited a degree of variability across vowel durations, and all speakers also presented some instances of vowel reduction, including use of a schwa at times.

This paper therefore presents evidence of a fair degree of variation within MaltE with respect to vowel duration, which in turn has a bearing on the perception of rhythm. Variation in vowel duration, both in itself (preferred use of full vowels rather than schwa), and in so far as variation in successive vowel durations contributes to differences in rhythm, can also be seen to be a trigger in the perception of MaltE.

The findings from this study set the stage for further work on variation in MaltE at the phonetic/phonological levels, particularly in relation to those elements which may affect the duration of both vowels and consonants at the local level, and consequently rhythm more globally. Among the characteristics

and features already under preliminary investigation in Grech (2015), rhoticity is noteworthy, also because greater use of a postvocalic 'r' may trigger compensatory shortening in the preceding vowel, while an absence of this feature may also in part account for differences in vowel durations as compared to contexts where an 'r' would not be expected. The features discussed here, and others where durational properties can be captured and analysed at the phonetic level, may combine to generate a perception of variability in rhythm in MaltE at the phonological level. This dual focus of analysis at both the phonetic and the phonological levels of certain features may therefore be a useful approach to developing a more refined understanding of variation in this emerging variety of English.

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