RHYTHM AS A CUE TO IDENTIFIABILITY IN MALTESE ENGLISH

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ABSTRACT

Evidence is emerging to suggest that rhythm is possibly one of the more salient cues in the identification of Maltese English, a variety of English, distinct from other varieties, which is used extensively by many Maltese speakers of English.

An attempt is made at using the Pairwise Variability Index (PVI) to: (i) categorize the clearly 'different' rhythm of this variety of English; and (ii) begin to explore whether it can be used to capture intra-variety differences – one of the hallmarks of Maltese English – across speakers. This preliminary empirical study of rhythm in this variety also gives scope for a discussion of some of the challenges for, as well as the potential of, using the PVI measure to capture information about both 'local' and 'global' variability. Furthermore, possibilities for establishing a correlation between the PVI and 'identifiability' are explored.

Keywords: Maltese English, variety, rhythm, Pairwise Variability Index, identifiability.

1. INTRODUCTION

The alacrity with which native speakers of a language or language variety accurately identify each other suggests that there is information in the pronunciation, at the prosodic level as well as at the segmental level, which has an indexical function of some sort. Evidence is emerging to suggest that rhythm is an important cue to listeners' identification of Maltese English, a variety of English used extensively by many Maltese bilingual speakers of English.

One of the distinctions on rhythm made by Pike [22], Abercrombie [1] and others, is that between "stress-timing" and "syllable-timing" [1, 22]. A third type of rhythm – not considered further here – "mora-timing", has also been proposed [5, 16].

The syllable-timing versus stress-timing dichotomy is incontrovertibly, though not uncontroversially, linked to the notion of the perception of rhythm being related to "timing". The assumption is that, whereas in syllable-timing syllables are supposed to occur at regular intervals of time, in stress-timing it is stressed syllables which occur at regular intervals of time, feet being said to be "isochronous" [1]. Whilst capturing the underlying source of differences in rhythm has proved to be a somewhat elusive exercise, a number of different ways of working with rhythm have been developed. One such attempt involves use of the so-called Pairwise Variability Index, which measures the duration of vocalic and/or intervocalic (or consonantal) intervals, and then calculates the average of these durations [15].

This paper seeks first to categorize the clearly different rhythm of Maltese English (MaltE). It also begins to explore whether, and to what extent, the PVI can be used as a basis for examining intra-variety differences in the specific case of MaltE, a variety characterised by a great degree of variation across its, largely bilingual with Maltese, speakers [30].

2. LITERATURE REVIEW

2.1. Measuring rhythm

Research on rhythm has gone full circle from the original views of [22] and [1]. Roach [24] has however suggested that "there is no language which is totally 'syllable-timed' or totally 'stress-timed'" and is supported in his belief that there is a need to shift away from such broad classification by, e.g. [10]. More recently, a number of attempts to identify reliable acoustic measures in support of classifications of this sort have been made.

The emphasis in work on rhythm is on the alternation of prominent and non-prominent elements in spoken language "as perceived by the listener" cf. e.g. [19:1]; also [2]. Nevertheless, Grabe and Low [15] set out to use the Pairwise Variability Index (PVI) to illustrate that, rather than going for a rigid typology, acoustic measurement of various phonetic parameters can be useful in establishing a continuum to capture differences in the rhythm of different languages and language varieties.

By measuring variation in successive speech units, the PVI allows differences in the rhythmic characteristics of different languages and language varieties to be captured. Prototypically "stress-timed" languages, given, amongst other things, the possibility of vowel reduction, allow greater variability in the duration of such intervals, and would therefore have a **higher** PVI. Those verging

more towards the "syllable-timed" type are likely to have a **lower** PVI. Although the PVI has been used as a measure for trying to categorize differences in the rhythm of different languages and language varieties, it is not uncontroversial. For example, Arvaniti [3] shows that the measure is on the one hand highly sensitive to changes in speaker tempo and text type, and on the other hand, is not consistently sensitive enough to be used as a way of classifying differences between languages.

Nevertheless, Nokes and Hay [19], have demonstrated that the PVI is a useful measure, especially if one uses it to calculate the variability between any two consecutive features, intensity or pitch variation, for example, as well as duration.

2. 2. Maltese English, rhythm and identifiability

Maltese English, MaltE, is the variety of spoken by bilingual speakers of Maltese and English, especially those who grow up in Malta [30]. Recent research has begun to identify a relatively 'stable' set of distinguishing characteristics cf. Appendix in [7] and below, for a list of these. One feature of MaltE which can be considered a key characteristic, however, is the extent of variability both across speakers, and sometimes even within the same speaker. A recent PhD thesis [28] has examined precisely this dichotomy in an attempt to begin to understand what leads listeners to recognise it with such ease. In this context, the element of rhythm has come under the spotlight.

A number of phonetic and phonological characteristics have frequently been noted in the literature as being characteristic of MaltE:
- neutralisation of the θ/ð contrast to t/d [18, 25];
- full release of final plosives [12];
- devoicing of final voiced obstruents [13];
- clear 'l' in all syllable positions [29];
- pronunciation of ŋ as ŋg [29];
- tendency to avoid antepenultimate stress, e.g. in words of more than two syllables with an unstressed vowel in the final syllable (kæ.ter.'pɪl.ler for 'kæ.te.pɪ.lə), those with a full unstressed vowel rather than a syllabic consonant (e.g. bæp.'tɪ.zɪm for 'bæp.'tɪzm̩) or compounds with a bisyllabic second element (e.g. faɪ.ər.'en.dʒɪn for 'faɪə.en.dʒɪn) [29];
- limited deaccenting [14];
- different intonation patterns especially in cases of early focus, resulting in post-nuclear phrase accents involving a distinct pitch contour [8, 18, 29].

Apart from the above, a number of other, 'local' elements are worth mentioning here. These include:
- substitution of æ by e [28, 25, 29];
- limited reduction of short unstressed vowels to ə and limited use of syllabic consonants [9, 28, 25, 29];
- rhoticity [7, 28, 25, 29];
- gemination [29].

These 'local' elements contribute to an increase in syllable complexity and, though not the focus here, are of interest because such syllable complexity has also been shown e.g. by [10, 17] to be a contributor to distinct rhythmic patterns, not least in the variety being reported on in this paper [28]

Some attention has been given to the rhythmic characteristics of MaltE. [9] and [29] both make reference to the fact that aspects of segmental realisation impact on that of lexical stress and hence on rhythm. Up until [28] however, no empirical work on this aspect of the variety was undertaken. Given the general understanding of rhythm as "the patterning of prominent elements in language, as perceived by the listener", Barry [4:113] claims that it may be useful, in the context of L2 learning, to think of such "prominent elements" as "the sum of these (essentially segmental) properties [being] the determining features of an acceptable (prosodic) prominence pattern". The idea of an "acceptable" pattern shifts the focus onto what the listener perceives as 'permissible', or possibly 'more usual', and, inevitably, on effects of 'local' features (such as the realisation of individual segments) at the more 'global' level.

The notion of what is 'identifiable' in a variety could therefore perhaps be captured as a function of the clustering of features, at different levels, global as well as local, which trigger listeners to associate the speaker with what is 'typical' of other speakers of that variety. This idea is at the basis of [28]. This research tries to uncover patterns which lead speakers of MaltE to be able to recognise other speakers of the variety easily. Some of the more readily identifiable features such as vowel substitutions have been widely parodied, but clearly other features are also evident. Using a perception task involving Magnitude Estimation, [28] attempted to develop a way of profiling 'identifiability' in MaltE. Rhythm was found to be a strong indicator of such 'identifiability'. The 6 speakers analysed had PVIs ranging from 50 (less variability) to 81 (high variability), with the speakers rated as most identifiable falling within the 50-60 range, while the speaker rated as slightly identifiable had a PVI of 69. The speaker least readily identified as being a speaker of MaltE had the highest index in the cohort, 81. The speakers with the lowest PVIs however, also used other 'local' features (see list above) in very distinct ways. In the analysis reported here, an attempt is made to begin to explore this interplay between the 'global' effect of rhythm and 'local' realisations of segmental features in terms of the extent to which a speaker is recognised as 'typical' of other speakers of this variety.

The questions that we address here are therefore:

- To what extent can the PVI measure differences in the rhythm of MaltE speakers?
- To what extent can the PVI be used to predict a more or less identifiable MaltE speaker?

3. METHODOLOGY

This paper reports on the analysis of a read text involving 4 female speakers and comprising around 215 syllables (including the few instances of disfluencies). 3 of the speakers, F2, F3 and F4, have lived in Malta for most of their lives. To a Maltese speaker of English, the 'English' spoken by these speakers is undoubtedly MaltE. F1, by contrast, though also Maltese, grew up in Malta, but also lived and worked in England and Africa throughout her career as an English teacher. Her 'English' is the least identifiable as that of a Maltese speaker of English. Identifiability ratings based on the analysis carried out in [28] for speakers F1 and F2 place these two speakers at different ends of a continuum with F2 being perceived as a more 'identifiable' MaltE speaker (i.e. more identifiable as Maltese on the basis of her accent) than F1.

The data analysed consists of a reading of a short news item-type text. The recordings involving speakers F3 and F4 form part of a corpus of MaltE data collected in the context of [28]. F4 is a dominant speaker of Maltese who uses English mainly to communicate with speakers who do not speak Maltese although English would be her favoured mode of communication in writing, particularly in the context of her work cf. [30]. F3, although also a dominant speaker of Maltese, interacts in a more bilingual context where codemixing and codeswitching would be the norm. F1 and F2, for whom, as mentioned above, identifiability ratings are available were recorded using a Tascam DR100-mkII recorder in a quiet environment reading the same news item text.

The recorded passages were annotated and segmented using Praat Version 5.3.84 [6]. The analysis was carried out following [15]. One particularly interesting (and tricky) aspect of the analysis involved the segmentation of 'r' segments since, in spite of the characterisation of MaltE as generally rhotic, this feature is one of the least stable, with speakers alternating between different 'r'-type realisations, not all of which are fully articulated, with 'r'-coloured vowels being one possibility [7]. Further research of this aspect is necessary but will not be dealt with here.

Normalised PVIs (nPVIs) were then calculated for both vocalic and intervocalic intervals: this paper reports only on vowel nPVIs.

4. RESULTS

The results of the analysis carried out in the context of this study, presented in Figure 1, reflect those of previous research on the measurable acoustic cues of rhythm in MaltE [28].
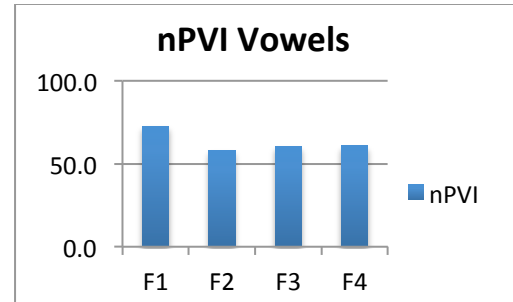

Figure 1: Normalised Pairwise Variability Index (nPVI) for 4 MaltE speakers

These data indicate a cluster of 3 speakers – F2, F3 and F4 – presenting similar nPVI values, compared with F1 who presents a substantially higher nPVI than that of the other speakers. F2 was identified in [28] as being a more 'identifiable' MaltE speaker than F1 (the speaker who, though Maltese, has a history of having lived and worked outside of Malta). F2 clusters with F3 and F4, all presenting present indices between 58 and 61, see Figure 1.

The nPVI for F1, the speaker rated in [28] not to be a typical MaltE speaker, by contrast, is higher at 72. The values obtained from the 'new' nPVI analyses for F1 and F2 carried out here (72 and 57 respectively), are comparable though not identical (81 and 57 respectively), to those obtained in the earlier study reported in [28], see Table 1.

Speaker	F1	F2
nPVI as reported in [28]	81	57
nPVI this study	72	57

Table 1: Comparison of Normalised Pairwise Variability Index (nPVI) for F1 and F2 in an earlier study [28] as compared to in this study

The discrepancy in the nPVI results for F1 may be related to effects such as the overall length of the text analysed, tempo [3, 4] etc. Nevertheless, the distinction between the two speakers can still be seen even if the actual index is not identical across the two studies. Results such as these suggest, as in [3, 26] that there is a lot more to the PVI as a measure for capturing underlying patterns worthy of further study than meets the eye.

Within the group of just 3 speakers, it is worth noting that although quite closely grouped, evidence of some element of variability still emerges. This begs the question: would similar or other effects, one of which will be briefly examined below, emerge in a study involving a more representative sample?

Table 2 below presents the mean length and St(andard)Dev(iation) of the vowels of each speaker in this study. Some interesting observations can be made with respect to these, in the light of the respective nPVIs.

Speaker	nPVI	Mean V length msecs	StDev
F1	73	80.5	52.5
F2	58	84.2	44.5
F3	61	79.8	45.6
F4	*61*	*99.3*	*53*

Table 2: Normalised Pairwise Variability Index (nPVI) and mean V length in milliseconds and StDev for 4 MaltE speakers

For example, of the four speakers F4 was intuitively expected to be highly identifiable as a speaker of MaltE due to her use of many of the features listed in 2.2. In fact, her nPVI is low, although not as low as F2's, suggesting a rhythm characterised by less variability across different units. Additionally, mean vowel duration for this speaker is very high. This, combined with a relatively low StDev, suggests use of vowels which echo the many references to 'marked' vowel realisations in MaltE. Therefore whilst the global nPVI effect of 61 contributes to this speaker being highly identifiable as a speaker of MaltE, the effect is heightened by local vowel realisation effects. This interplay of global with local effects certainly warrants further investigation.

4.2. Correlation with typicality

Typicality ratings obtained from the earlier study for F1 and F2 place them as atypical and highly identifiable respectively, and nPVI was used, alongside other analyses, to explore an early account for these results. As F3 and F4 cluster more closely with the highly identifiable F2 in these data, separating the cohort from F1, it is fair to suggest that F3 and F4 would also be considered highly identifiable MaltE speakers.

5. DISCUSSION

It is clear from comparison of the nPVI obtained from two successive studies that there is some form of patterning, and that a PVI can capture this. The nPVIs for one group of speakers in both studies was consistently lower than for one other speaker, F1, considered atypical (less Maltese sounding) for MaltE. However while a PVI analysis is effective at capturing the global effect of some patterns, there are many other layers of analysis, including effects from the segmental level, which may be combining to contribute towards this global effect. Although controversial in some respects and not always fully applicable to the understanding of all aspects of rhythm, the PVI therefore does present an opportunity to concentrate on the global effects of localised phonetic detail, a feature of this measure which we attempt to exploit in the preliminary analysis of the rhythm of MaltE reported on here.

Some studies [21, 26, as well as the original study in which PVI was first presented, 15] suggest a cline of measures reflecting subtle variation across different speakers, including across speakers of different languages or language varieties. The PVI has been considered especially successful as a means of capturing what might be perceived as nuanced distinctions *within* a variety or dialect of a language [21], rather than as a way of contributing to our understanding of rhythm classification in languages. It is this nuanced measure of how phonetic details of a very localised nature – such as, but not limited to, successive vowel durations, as in the case of this study – which may combine together to contribute to the globalised effect of a perception of difference in rhythm and timing that seems to be the PVI's greatest strength.

6. CONCLUSION

The perception of variation within a variety remains subject to further study, but these preliminary findings suggest that it is useful to look at the interplay between localised and globalised segmental and suprasegmental features which may contribute to a kind of layered process of perception. The globalised pattern might be captured at the phonological level, which may serve to determine a native listener's perceptions in terms of broad categories, such as "identifiably Maltese" or "maybe Maltese, but not at all typical" and so on. At the same time, another process of perception of segmental features, including the perception of fuller vowels, or longer vowels, at a more localised level, is serving to further fine tune that original broad categorisation into something more specific.

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