

THE PHONETICS AND PHONOLOGY OF *WH*-QUESTION INTONATION IN MALTESE

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ABSTRACT

This paper reports on an analysis of *wh*-question intonation in Maltese. The study aims to provide evidence for a characterisation of one aspect of the intonation of *wh*-questions. It focuses on the initial H tone reported to occur at the beginning of such questions in Maltese and tries to establish an empirical basis for an analysis of this H tone. Results show that a H tone target is indeed always present on the *wh*-word in Maltese *wh*-questions. Moreover, the H tone seems to be associated with the first syllable of the *wh*-word, whether this syllable is accented or not. Furthermore, the H tone in question is characterised by a raised F0 as compared to other H tone targets across a range of sentence types.

Keywords: intonation, *wh*-questions, Maltese, intonational phonology, speech prosody.

TAQSIRA

Ir-riċerka rrapurtata hawn tagħti harsa lejn il-fonetika u l-fonologija ta' l-intonazzjoni assoċjata ma' mistoqijiet li jintużaw biex wiehed jitlob tagħrif dwar diversi aspetti tat-tifsir, bl-Ingliż '*wh*-questions'. Ir-riżultati juru li t-ton għoli assoċjat ma' l-avverb interrogattiv f' mistoqijiet ta' dan it-tip jinkluda kmieni fil-kelma interrogattiva, u li huwa oghla minn tonijiet għoljin oħra li jinstabu f' sentenzi ta' tipi oħrajn.

1. INTRODUCTION

This study attempts to throw light on the nature of the intonation of Maltese interrogative word questions (henceforth referred to as "*wh*-q(uestion)s" even though interrogative words in Maltese are **not** "*wh*-words"). Working within the autosegmental-metrical (AM) framework of intonational phonology, see e.g. [15] and [11], the study aims to answer two main questions: 1) Is the initial H tone in *wh*-qs, associated with the boundary at the left edge of the phrase, with the beginning of the *wh*-word or with the accented syllable of the *wh*-word? 2) Is the H tone in question as high as it has been claimed to be?

Although the intonation of *wh*-qs in Maltese has not to date received much attention, the use of falling intonation in such questions has been noted e.g. in [17, 19] and [12]. A falling intonation pattern in *wh*-qs has similarly been noted to occur in a variety of

other languages, European, such as Italian [11] and European Portuguese [7, 8], as well as non-European ones such as Moroccan Arabic [1] and Tamil [10]. However, while the *wh*-q tune in Maltese may, superficially at least, seem similar to the falling tune in declaratives, [17, 19] claim that it in fact comprises a separate and different intonational entity.

It has been claimed that languages differ with respect to whether or not they accent *wh*-words, see e.g. [11]. While the accenting possibilities in the read speech data examined here are likely to be limited (but see [5] and [9] for more on information structure effects on accenting and intonation in data from natural discourse), the issue of the accenting or otherwise of the *wh*-words in the data examined cannot be ignored.

2. INTERROGATIVE WORD (*WH*-) QUESTIONS IN MALTESE

2.1. *Wh*-words in Maltese and *wh*-questions

According to [16], interrogative word or *wh*-qs in Maltese are usually introduced by an interrogative adverb or pronoun such as *kemm* 'how much', *xi* 'what', *min* 'who', *minn fejn* literally 'from where'. Although a number of interrogative adverbs or *wh*-words in Maltese are di-/tri-syllabic, see list in [14], not only are a number of the more commonly used *wh*-words monosyllabic, many of them start with a voiceless stop or fricative so that there is often no segmental material prior to the stressed vowel of the *wh*-word to carry voicing. This often makes it harder to establish the precise nature of the tonal events occurring at the start of the *wh*-word.

Wh-words in Maltese can occur in most positions in a sentence. While the canonical *wh*-q version of *It-tifel mar il-Belt*. 'The boy went to Valletta.' would be *Fejn mar it-tifel?*, (*wh*-word underlined), 'Where has the boy gone?', other word order possibilities also exist, e.g. *Mar fejn it-tifel?*, *It-tifel mar fejn?* etc. The unacceptability of **Fejn it-tifel mar?* parallels that of a *VSO order of constituents in Maltese, e.g. **Mar it-tifel il-Belt*. reported e.g. in [3], [6] and [17]. Differences in the position of the *wh*-word and/or information structure bring about topicalisation and

intonational effects of various sorts, research on which is still needed. There is only one *wh*-q in the data set analysed having a non-initial *wh*-word; in all the other *wh*-qs analysed, the *wh*-word occurs in its more usual, sentence-initial, position.

2.2. Maltese *wh*-questions and intonation

Although [4:9] mention the less usual case of a rise on the *wh*-word in cases involving a clause subordinated by *li* ‘which’, they imply, in agreement with [17] and [12], that the “neutral” form for *wh*-qs involves a fall in pitch.

The description of the intonation of *wh*-qs in [17, 19] coincides with that in [12]. Both authors suggest that *wh*-qs in Maltese tend to start with high F0. In fact, [17] proposes an analysis of *wh*-q intonation as consisting of an initial H boundary tone, %H, associated with the left phrase edge, followed by a L* pitch accent on the final accented syllable of the phrase and a final L boundary tone, L%, associated with the right edge of the phrase. Moreover, [12] notes two tendencies in Maltese *wh*-qs: 1) a higher F0 onset in such questions as compared to other types of utterances; and 2) an association of the F0 peak with the first syllable of the utterance, regardless of whether this is accented or not. The latter, also noted in [19], has not been corroborated empirically.

3. METHODOLOGY

This study is based on the analysis of the standard Maltese of speakers for whom data are available in a recently compiled corpus of spoken Maltese, see [20]. Read sentence data taken from 4 of the 16 corpus participants, 2 female and 2 male, served as the basis for this analysis. The speakers are identified below as F1, F2, M1 and M2.

The read sentences in the corpus were designed to represent different sentence types, presumed, on the basis of the analysis in [17], to exemplify as full a range as possible of both pitch and phrase accent types, (see also [18]), and boundary tones, available for use by speakers of Maltese. Thus, the data set included tag questions, sentences ending in a final vocative, imperatives and *wh*-qs. A total of 34 sentences per speaker were recorded. Of these 2 of F1’s sentences were found to be unusable and were therefore discarded. 1, 2 and 3 respectively of F2, M1 and M2’s sentences were also discarded. 9 *wh*-qs were recorded for each speaker: one of these involved a non-initial *wh*-word.

The read sentence data for all 4 speakers were analysed in order to obtain a basis for comparing the scaling of the H tone target in the *wh*-qs to that of other H targets across the different sentences. The

speech analysis software program PRAAT (version 4.5.15), [2], was used in the analysis. Measurements of the following were recorded in Hz: i) F0 at sentence onset (F0on); ii) Overall max(imum) F0 (F0max); iii) Overall min(imum) F0 (F0min); and iv) F0 at sentence offset (F0off). In cases involving tag questions, vocatives or sentence adverbials, F0max measurements were taken separately for any extrasentential element, as well as for the main sentence. Speaker range was calculated by subtracting F0min from F0max. Average values for all of the above were calculated in Hz across the full data set for each speaker.

In the case of the *wh*-qs, measurements in Hz were recorded as follows: i) F0on; ii) Max F0 for the stressed syllable of the *wh*-word; iii) F0 at the end of the stressed syllable of the *wh*-word; iv) Max F0 for the final stressed syllable; v) F0 at the end of the final stressed syllable; vi) F0off. Once measurements had been recorded, speaker averages in Hz for the 6 values for all the *wh*-qs with the exception of the one case having a non-initial *wh*-word were calculated.

In an attempt at abstracting away from speaker differences, normalisation was also carried out using an adapted version of the formula proposed by [13]. Averaged Hz values for F0max and F0min across the full data set for each speaker were converted to ERB for reasons to do with presumed greater reliability, see [13]. The averaged values for the *wh*-qs were converted to normalised ERB values using the formula derived from [13] shown in (1) below:

$$(1) \quad NORMerb = \frac{ERB - \bar{L}i}{H i - \bar{L}i} \times 100$$

where H_i is averaged F0max and L_i is averaged F0min for each speaker across the full data set. The decision to use averaged values for F0max and F0min, rather than the peak on the *wh*-word in *wh*-qs and the lowest point in the contour as in [13], was taken after consideration of certain facts about Maltese intonation as well as inspection of the data.

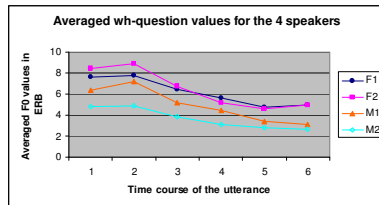
4. RESULTS

4.1. Global shape

This analysis suggests the existence of a great deal of similarity across speakers in the read speech “neutral” renderings of the *wh*-qs in the data set analysed. This generalisation holds in spite of clear differences in speaker strategies (e.g. of the speakers analysed, F2 was the who tried to put most “expression” into her rendering of the read sentences, this speaker’s range in fact being by far the widest of the lot at 202Hz as compared to ranges of 146Hz, 157Hz and 81Hz for F1, M1 and M2 respectively).

Averages in ERB for the values listed in 3.2 for each speaker's *wh*-qs are shown in Fig. 1. Across speakers, the global shape which emerges matches that of the falling contour in *wh*-qs described in [17, 19] and [12].

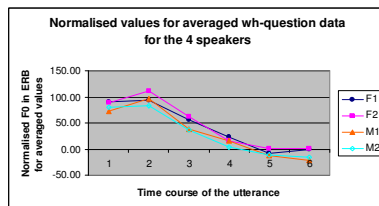
Figure 1: Averaged *wh*-q values (by speaker).



A slight sentence final rise, not mentioned in the literature, can be noted for both F1 and F2 between the end of the stressed syllable closest to the sentence end and the right edge of the phrase. Further analysis is necessary to determine whether this sentence final rise (noted also in other data analysed but not reported here) is a function of differences in speaker strategy, or whether, more significantly, pitch accent assignment on a final content word is also involved.

Normalised values for the averaged *wh*-q data are shown in Fig. 2.

Figure 2: Normalised *wh*-q averages (by speaker).



The similarity across speakers, particularly in the early part of the *wh*-qs, is striking.

4.2. Location of the H tone target

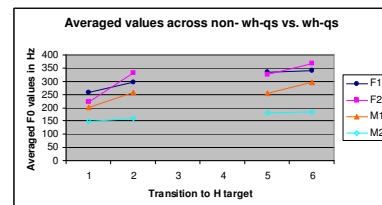
A noteworthy feature of the *wh*-q contours shown in the figures above is the fact that F0on and F0max values are at the same level for 2 speakers, F1 and M2. With the exception of only one of the *wh*-qs analysed, *Għalfejn qieghda tghagġibha?* 'Why are you making such a fuss?', the *wh*-word is either monosyllabic and/or starts with a voiceless fricative e.g. *min* 'who', *xi* 'what', *fejn* 'where', or is stressed initially e.g. *meta* 'when' (where necessary, lexically stressed syllables are indicated in bold). The implication of the level transition between F0on and F0max is that the target for the H tone occurs very early indeed for many speakers. The significance of this increases when one considers that, upon closer examination, the target for F0max in most of the *wh*-qs analysed is reached, at the latest, by the start of the vowel of the first syllable of the *wh*-word. This is so even in the different speaker renderings of *Għalfejn*

qieghda tghagġibha? in which lexical stress on the *wh*-word falls on the final syllable. Analysis of *wh*-q data containing a more varied, even if more controlled, selection of *wh*-words differing in both the number of syllables and location of lexical stress, is clearly needed.

4.3. Scaling of the H tone target

The relationship between F0on and the first H tone target across all the data analysed barring the data for the *wh*-qs, is compared to that between F0on and the H tone target on the *wh*-word in the *wh*-qs in Fig. 3. Non-*wh*-q averages in Hz for the data appear on the left hand side of Fig. 3, while *wh*-q averages appear on the right hand side.

Figure 3: Non-*wh*-q vs. *wh*-q values for the transition from F0on to F0 on the H target immediately following (by speaker).



The above shows that not only is the averaged F0on in *wh*-qs higher than is the case across the rest of the data set; it is also clear that the target H in the *wh*-qs has a higher average F0.

4.4. Accenting of the *wh*-word?

This analysis leaves no doubt that the *wh*-word in all the examples analysed is accented. Significantly, in the one example of a *wh*-q having a non-initial *wh*-word, *Inti x'se tagħmel?* literally 'You, what do you intend to do?', the H tone target appears to coincide also in this case with the start of the *wh*-word, and this across all the data analysed.

In a few isolated cases, e.g. F2's rendering of *Meta ħa tmur l-Ingilterra?* 'When do you expect to go to England?' a final high rise on *Ingilterra* can also be noted. An analysis suggesting two separate foci, one on the *wh*-word, and a second on the part of the sentence, in this case *Ingilterra*, that the speaker would like information on, could be postulated. Informal analysis by the author has in fact shown that a second "locus of interrogation", to borrow a term used in [9], can often be noted to occur in Maltese *wh*-qs taken from natural discourse. Analysis of natural discourse is in fact likely to be an avenue worth going down in any attempt at exploring the status of accenting in *wh*-qs. What is clear nevertheless is that, even on the few occasions in which a second "locus of interrogation" occurred, no

examples of non-accenting of the *wh*-word have been noted.

5. DISCUSSION

This analysis of the H tone target at the start of *wh*-qs has confirmed both the tendency for an early onset for the initial H tone, and the fact that the target for the H tone on the *wh*-word of such questions is generally higher than that for other H tone targets in Maltese. These findings hold for all the speakers for whom data were analysed.

Three possible analyses of the H tone in *wh*-qs in Maltese spring to mind: 1) one involving a H* target on the *wh*-word; 2) another involving a bitonal H+L* pitch accent on the *wh*-word; 3) and yet another involving a left-edged H boundary tone, %H, followed either by a downstepped !H* or by a L* associated with the stressed syllable of the *wh*-word.

The isolate example of a *wh*-q having a non-initially stressed *wh*-word, see above, appears to refute the possibility of interpreting the H tone target as a H*. While the second possibility mentioned appears appealing, the similarity of the *wh*-q pattern described here to that of the so-called ‘vocative contour’ described in [17] suggests that further analysis needs to be carried out before an analysis in terms of a H+L* can be accepted. The third possible analysis, although one which is not as easily accommodated within the AM framework of intonational phonology, appears worth considering, but once again, further study is necessary.

Further to the above, one can postulate the existence of some kind of [raised peak] for the H tone target on *wh*-words. Raising of F0 H target tones in interrogative words has been reported to be the case e.g. in Tamil [10] but brings with it the not completely mainstream idea of the implication that a phonetic resource such as the raising of F0 be used in the marking of a category of a more ‘phonological’ nature such as, in this case, interrogativity (see also [11] for a discussion of the linguistic vs. paralinguistic functions of [raised peak]).

6. CONCLUSION

The results of this study show that a H tone target is consistently associated with the first syllable of the *wh*-word in *wh*-qs in Maltese. Although the precise anchoring point of the H tone cannot be determined on the basis of this study, it is clear that the target for the H tone occurs earlier than at the accented syllable of the *wh*-word. Empirical evidence to support the suggestion in [12] that the H tone target associated with *wh*-words tends to have an exceptionally H target has also been found.

Further research, particularly research using *wh*-q data which is on the one hand more varied, and on the other hand controlled to include instances of *wh*-words having different syllabic and stress structures, needs to be carried out. Moreover, it would be useful to examine data involving *wh*-words occurring in positions other than sentence initial. Lastly, research on *wh*-qs taken from natural discourse would be a useful way of examining the nature of accenting in Maltese *wh*-qs.

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