Intonation in Iraqi Musical Melodies

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Abstract

This paper deals with intonation in Iraqi musical melodies (MMs). As such, it aims to analyze the intonational patterns in the Iraqi music. The main musical melodies in the Iraqi music are Rast, Dasht, Hijaaz, Kurd, and Bayaat. In this vein, the current study attempts to answer the following questions: the current paper attempts to answer the following questions: (i) what are the intonational patterns of Iraqi MMs? And (ii) what is the additional function of intonation in MMs? In the light of these questions, the corner hypothesis is that Iraqi MMs have their own specific definable intonational patterns. On the basis of the analysis, it is concluded that intonation can be a useful tool for analyzing musical variations in the basic Iraqi MMs. Moreover, musical intonation, which is the task of musicologists, is accompanied by phonological intonation to create the final form of the melody. Finally, in addition to previous functions of intonation, such as grammatical, semantic, and so on, intonation has a new one, namely 'musical function' because it gives music special effects and evaluations.

Keywords: Iraqi music, melodies, intonation, patterns, phonology

1. Introduction

The aim of this paper is to present a phonetic and phonological analysis of the intonation of Iraqi musical melodies (henceforth, MMs) (*Al-Maqamaat*). This paper focuses on the basic intonation patterns in the basic five melodies. These include: Rast, Dasht, Hijaaz, Kurd, and Bayaat (Al'adhami, 2010, p. 2-5). The hypothesis of this research is that Iraqi MMs have their own specific definable intonational patterns. The marginal melodic variations (In Arabic: *al-mayanaat*) are neglected throughout the study since the important point is the basic five MMs, and the changes in these secondary melodies are only in the length or duration of highness and lowness, exceeding 360 kinds (See Saeed, 2011, p. 15). Moreover, the varieties in such melodies are unlimited and open to additions by Qur'an readers, chanters, singers and so on. However, those depend on the basic patterns in their melodization. Thus, the researchers think that there is an additional function of intonation, namely "the melodic function", via which one can recognize the type of the MMs and its mood, whether melancholic, happy and the like. Thus, the current paper attempts to answer the following questions:

1. What are the intonational patterns of Iraqi MMs?
2. What is the additional function of intonation in MMs?

In the light of these questions, this study employs the following procedures:

1. Reviewing literature on intonation and musical analysis.
2. Selecting a model for analysis.
3. Figuring out electronic spectrographs for each MM.
4. Discussing results of data analysis.

This study is supposed to be significant for phonetician, phonologists, musicians and anthropologists.

2. Theoretical Background

2.1 Definition of Intonation

To define intonation is not uncontroversial. Thus, different scholars provide different ways of defining intonation. Jones (1960, p. 55) defines intonation as "the variations which take place in the pitch of the voice in connected speech, i.e. the variations in the pitch of the musical note produced by vibration of the vocal cords." Here, he refers to the musicality of language through the use of intonation. As for Ladefoged (2001, p. 99), intonation represents changes in pitch at the level of sentence. "The part of a sentence over which a particular pattern extends is called an intonational phrase" (Ladefoged, 2001, p. 99). It seems that intonational phrase here is different from syntactic phrase because the first is information and phonological unit whereas the second is concerned with grammar. Similarly, Crystal (2003) indicates that intonation refers to "the distinctive use of patterns of PITCH, or melody" (p. 241). Here, the author considers melody as a near-synonym for pitch or as an informal equivalent. Thus, he thinks that referring to pitch would cover all aspects of intonation such as tones, tonic syllables, and tone units and so on. Clark et al. (2007, p. 361) used the term 'tune' rather than 'pitch' in their definition of intonation. They (Clark et al., 2007, p. 361) assert that tune choices are highly organized structures. Moreover, Mattews (2007, p. 201) sees intonation as a distinctive system of tones occurring over a piece of language in principle larger than a single word. However, this definition may be useful for English intonation because there is what are called 'tone languages' in which intonation plays a part at the level of single words. Besides, even in English we use intonation at the level of words and even mini-words such as interjections to do many things in conversation.

Ladd (2008, pp. 5-6) presents the following features for his definition of intonation:

a. Suprasegmental: intonation is a phonological suprasegmental feature. Thus, there is no difference between fundamental frequency (F_0) which is a physical feature and pitch which is its physiological correlate.
b. Sentence-level or post-lexical: intonation is related to meaning of whole phrases and sentences such as sentence type, speech act, and information focus. Hence, it excludes aspects of stress, accent, and tone that are determined in the lexicon.
c. Linguistically structured: intonational features are organized in terms of distinctive entities and relations (e.g. low/high) excluding other paralinguistic features such as tempo and loudness.

Ladd's (2008, pp. 5-6) definition correctly agrees with Cruttenden's (1986, p. 9), who relates intonation mainly to pitch movement, but disagrees with Coulthard's (1992, p. 96), which includes pitch movement as well as other paralinguistic features of loudness, length, speed, and voice quality. However, although such features are not directly related to intonation, yet they have some influence on the degree of highness and lowness of the pitch as we will see in data analysis. Hayes (2009, p. 291) affirms that intonation means the pitch variations at supra segmental level. Here, he refers to the prosodic feature of intonation which locates at the supra segmental domain of phonology. The scholar does not refer to the function of intonation. On the other hand, Curzan & Adams (2009, p. 90) assert that intonation is the "differences in pitch that can change the meaning of a sentence". Now, the authors refer to sentence as a linguistic unit for intonational analysis. Moreover, the term 'meaning' is supposedly used in a loose or vague sense or it may be informally used to include function, attitude, discourse and information. According to Yavas (2011, p. 172), intonation can be defined as "pitch variations that occur over a phrase or sentence". The problem with this definition is that it limits intonation to syntactic units of phrase and sentence. However, intonation is related to other linguistic units other than sentences. Ashby (2011, p. 173) considers this a type of confusion since we have to determine the exact unit of intonational analysis. Then, Yavas (2011, pp. 172-3) contradicts himself asserting that a tone unit or group "is the part of a sentence over which an intonation contour extends". Now, he talks about sentence and tone unit as a minimal unit of intonation. More accurately, Gussenhoven & Jacobs (2011, p. 145) clarify that it is "the use of pitch patterns to add discourse meaning to the expression". Here, they avoid the term 'sentence' using 'expression' which is more general and precise. In addition, they refer to discourse meaning, which may cover all kinds of meanings and functions.

The problems with most definitions presented above can be summarized in the following points:

1. Confusing the level of intonation: words, phrases, sentences or utterances.
2. Confusing intonational group or phrase with syntactic phrase.
3. Defining intonation in terms of pitch changes only, whereas it consists of more that as it is proved by other studies.
4. Referring to intonational functions as 'meaning' in a loose and sometimes vague sense.

5. Confusing terms such as 'pitch', 'tone' and 'tune'.

In fact, it is not the aim of this paper to solve all these theoretical problems. However such questions are open to a long debate. Hence, through this overview, the researcher adopts the following definitions and conceptions:

a. 'Tune' in mainly related to notes in the musical analysis; thus, it is an 'informal' equivalent to 'tone'.
b. 'Pitch' refers to the physiological, acoustic vibration in the vocal folds accompanying a stretch of language that can be described in terms of high/low (Lade foged, 2001).
c. 'Tone' is the intonational toneme that represents the smallest distinctive unit in intonation, and can be described in terms of 'rise, fall, fall-rise, rise-fall…etc.' (Ashby, 2011).
d. Intonation is the distinctive variations of pitch tones over an utterance resulting in changes in some aspects of the expression at the level of syntax, semantic meaning, discourse structure and pragmatic function.

2.2 Approaches to Intonational Analysis

There are two basic approaches of intonational analysis. These are the British tradition and the auto segmental-metrical (AM) model. The former is best represented by leading phonologists such as Halliday (1967), Crystal (1969), O'Connor and Arnold (1973) and Brazil (1997). This model is mainly based on the analysis of intonation in terms of tone groups and tone units. This is represented by what is called 'intonational phrase'. O'Connor and Arnold (1973) divide intonation unit into four basic parts:

1. The pre-head - all the initial unstressed syllables.
2. The head - between the pre-head and the nucleus.
3. The nucleus - the main stressed syllable (tonic syllable).
4. The tail - all the syllables after the nucleus.

It is asserted that 'nucleus' is the obligatory element in the tone unit, whilst the others are all optional. Concerning tones, this model tackles different types of pitch tones that have specific grammatical or discourse functions. Here are some examples:

1. Rise tone indicates positive attitudes.
2. Fall-rise indicates some degree of uncertainty, or a need for reassurance.
3. Rise-fall shows that the addresser is impressed or strongly agrees with the addressee (Davenport & Hannahs, 2010, pp. 88-9).

One of the problems with this model has been introduced by Clark et al. (2007) who assert that: The simple kind of notation adopted…, with tunes shown by conventionalized devices, and intonational phrases separated by boundary markers is adequate to show the basic options. It *does not reveal the details of* how a pitch fall may be distributed over several syllables, or what is happening in the rest of the intonational phrase, *nor does it cope well* with background variables, such as a general raising or widening of the pitch. (Our italics) (p. 363) The AM model, on the other hand, is preferred by most contemporary researchers (Ladd, 2008; Nolan, Online). AM manifestations are based on the analysis of the H (high) and L (low) tones of auto segmental phonology, which is mainly applied to tone languages, combining such tones into 'bitonal' elements, when needed. The 'Hs' and 'Ls' compose pitch targets, and pitch movements arise from integrating these targets (pitch variation in the British tradition). The 'metrical' side of the name emerges since certain tones are tied to metrically prominent events in the utterance (*viz* accented syllables). This type of prominence is represented in the notation by adding an asterisk '*' to the tone. Thus, we may have H* and L* tones. The other tones either precede (lead) or follow (trail) the tones with asterisks at some predetermined temporal distance without being relating to a specific syllable. The leading scholar of the AM programme is Pierrehumbert (1980) and subsequent work, for example Beckman and Pierrehumbert (1986). A more developed and modified version of Pierrehumbert's (1980) description is presented by what is called 'the To BI transcription system', which has been considered as a convention for transcribing American English, particularly in applications on speech corpora (Silverman et al., 1992; Beckman, 1999). Nolan (Online) asserts that "AM models assume that an intonational phrase boundary may (or in most versions must) have a *boundary tone* associated with it. We can illustrate this if we imagine a reply to 'But Melanie's never been near the manuscript' consisting of an incredulous 'Never?!' with an overall falling-rising contour."

2.3 Studies on Language and Music

It is worth to review some studies on the relationship between language and music to have a clear picture of our current study. Moreover, to study intonation of music means to study language in music.

Traditional studies affirm that music is vaguely related to language. They are only similar. For example, Adorno (1956) indicates that "[m]usic resembles language in the sense that it is a temporal sequence of articulated sounds which are more than just sounds. They say something, often something human. The better the music, the more forcefully they say it" (p. 1). Thus, he means that music is similar to language in sound articulations. According to Dunn (1984), music should be tied to the context or environment at which it is composed or produced as we relate language signals to the communicative context at which they are uttered. Power (1995; 1996) asserts that music is similar to language where we have musical syntax, musical semantics, and the like. His use of these terms seems to be metaphorical. Furthermore, it he relies on the general semiotic assumption that music is a language. Patel (1998) relates language and music to neural processing in the brain. He noticed some similarities of structural processing in music and language inputs inside the human brain. Hs hypothesis is that "linguistic and musical syntactic processing relies on distinct cognitive operations, but structural integration in both domains relies on a common pool of neural resources" (p. 39; see Patel et al., 1998). Jackendoff (2009) states that there are many things in common between language and music, such as 'metrical structure', 'neural areas', and 'audio-vocal apparatus', and then, he asserts that "The conclusion, then, is to urge caution in drawing strong connections between language and music, both in the contemporary human brain and in their evolutionary roots. This is not to say we should not attempt to draw such connections." (p. 203). Consequently, it is very important to study the relations between language and music.

Vendrova (2010) mentions that musical intonations have stylistic value in the message of any sonata (piece of music). "These musical conflicts reflect the serious contradictions in life, the ever-lasting struggles between life and death, between love and suffering." (p.28). This seems similar to the attitudinal function of intonation which reflects the emotional attitude of the speaker of sadness/happiness, love/hatred and the like (See Roach, 2000). In a more recent study, Siguroardottir (2012) clarifies that music can play an important role in ESL classroom. It "can be used to remove language barriers and should be implemented as early as the first grade. More music in every language classroom will inspire more students to become creative and independent" (p. 5). Thus, music is related to language in the sense that it could be treated as a new technique in teaching.

From this review, one can conclude the following points:

1. We can relate linguistic analysis to musical applications.
2. Language is related to music at different levels: neural, semantic, structural and so on.
3. We have what is called 'musical intonation', but this differs from the linguistic one, which is the topic of the current paper.

2.4 The Units of Music

Gilbers & Schreuder (2002) clarify that musical structure is similar to the linguistic one. Thus, as we expand linguistic domains gradually from phoneme to syllable, syllable to morpheme and then, morpheme to phrase and sentence, one can have this domain expansion in music where The smallest domain in music is the motif (built up out of notes), a little, rhythmic, melodic or harmonic building block, which is a recurrent element in the whole piece of music. Several motifs together form themes. A theme generally covers several measures and is regularly varied upon during the whole piece. The listener is always able to recognize the theme, although it can be somewhat different each time. He does this by reducing every occurrence of the theme to its underlying structure. Several themes together form a phrase, a kind of musical sentence. Several phrases can form a verse or chorus, etc. (p. 7-8) An example for this can be seen in Fig. 1. Below. Thus, in selecting the model for analysis, note will stand for syllable, motif for word, theme for a phrase, and section or chorus for a sentence or clause.

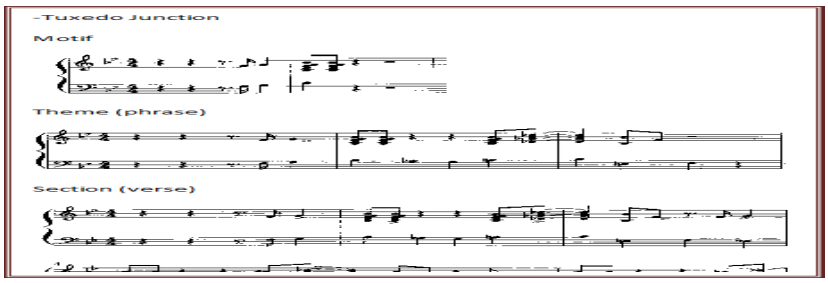


Figure 1: An Example of the Construction in the jazz Original 'Tuxedo Junction'. (After Gilbers & Schreuder, 2002)

3. The Model, Data Analysis and Results

3.1 The Model

Due to the problems with the British models presented in 2.2 and other reasons that will be mentioned in the current section, the AM model will be adopted as a tool for analysis. Ladd (2008, p. 91) assures that the AM notation gives more adequate analysis of the nuclear tone types than the British tradition, although, superficially, there may be some similarities. Ladd (2008, p. 91) summarizes the notation as follows: Pierrehumbert's notation represents the contour as a string of pitch accents and edge tones. All pitch tones consist of a single H or L tone, or a combination of two tones. In bitonal accents, one of the two tones is assumed to be central…indicated with an asterisk. (p. 87)

Moreover, other basic features of the AM notation are as follows:

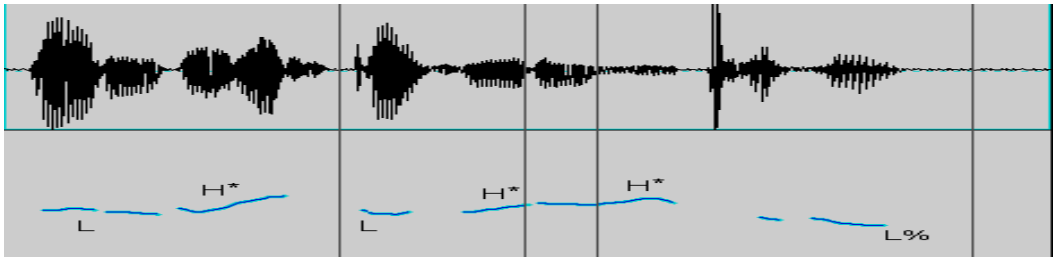
1. A pitch accent may have a leading (preceding) or trailing (following) tone, such as L+H*= High starred tone with a leading Low.
2. Edge tones are of two kinds: *phrase accents* (in our musical analysis we will use 'theme accent'), notated H- and L-, and *boundary tones*, notated H% and L%. These boundary tones are mainly single, located at the very end of the phrase accent, and sometimes at the very beginning (Pierrehumbert, 1980, pp. 40-55).
3. In a more developed version of the model, one can consider an additional middle prosodic unit namely an intermediate intonation phrase as Beckman and Pierrehumbert (1986) proposed for such apparently smaller units in AM theory. They introduce the phonological unit 'intermediate phrase' (IP) which is followed by a 'phrase accent / tone', whereas a full IP is followed by a 'phrase-accent / tone' and 'boundary tone'. However, for analytic reasons, the alternate for a phrase will be 'theme' (T).

3.2 Data Analysis and Results

The data will be five core examples, one for each MM. these examples are uttered by the second researcher himself according to his experience in Iraqi MM. These represent the key notes used in teaching Iraqi MMs.
The analysis will involve a spectrographic analysis for each melody, using modern computational programmes; then, writing the intonational equation for each melody. Finally, comparing the whole melodies to each other with an evaluative discussion will be presented.

3.2.1 The Rast MM

This melody is generally characterized by being used to express happy attitudes. Thus, it is mainly used in birthday songs, festivals, weddings and the like (Al'adhami, 2010, p. 22). Fig. (2) Shows the spectro-graphic analysis of this MM. The key note for this melody is 'aai'.



Aai ***aaai*** ***aah***

Figure 2: Spectro-Analysis of the Rast MM

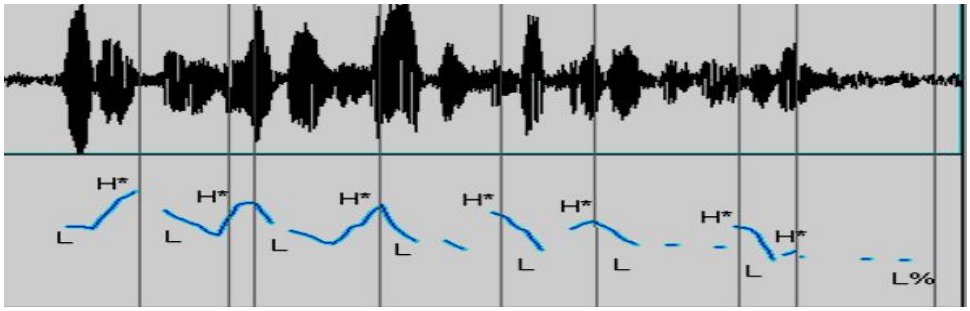
This MM is composed of three 'themes: aai, aaai and aah. The intonational equation for this MM can be seen as follows:[

L+ H* L+ H* H*+ L%.

Here, the actual assignment of the L+H* tones to motifs is quite straightforward in Rast. When there is a two-note motif, the L tone assigns to the first note and H to the second. When L+H* assigns to motifs of three notes or more, the H tone still appears on the last note (the stressed), however when the last note is unstressed like the example in Fig. (2), the H extends over the rest (the unstressed notes) of the motif, thus making it ride on the high tone of the previous note. In mono-notic motifs, both tones (L and H) assign to a single note. The phonetic realization for such an assignment is a rapid rise from low in the speaker's pitch range.

3.2.2 The Dasht MM

This melody is generally characterized as used to express sad attitudes. Hence, it is mainly used in melancholic festivals, ceremonies and the like (Al'adhami, 2010, p. 22). Fig. (3) Shows the spectro-graphic analysis of this MM. The key note for this melody is 'amaan'.



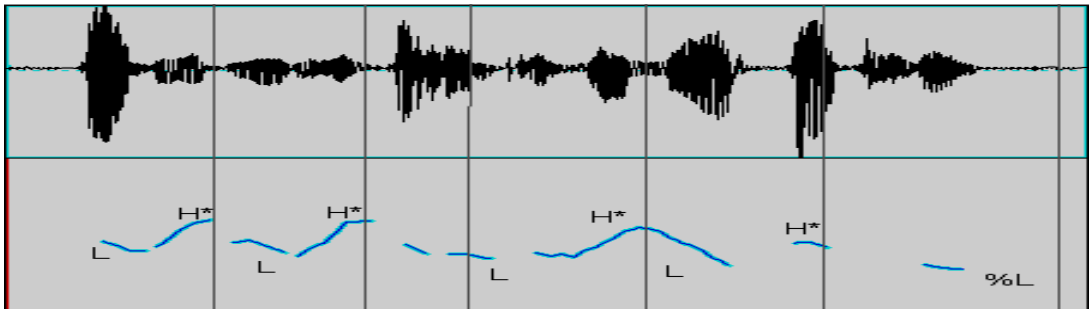
Amaan amaaaaan amaaaan

Figure 3: Spectro-Analysis of the Dasht Melody

The Intonational Theme (IT), here, is signaled by L% boundary tones on the right edge of the section (chorus), and H% for other themes or notes. However such boundary tones are not the only clues of signaling the Intermediate Theme (IT). Another property that marks the right edge of an IT is lengthening of the final vowel. An IT, on the other hand, has no boundary tones, but can be identified by the blocking of down step. The left edge of an IT corresponds to the left edge of an AT that is the initial AT in a theme. And IT may contain one or more ATs, and is thus the domain of down step. The end of IT is marked either by H or L tones. Non-final ITs are specially marked by their higher pitch register. The equation of this MM can be represented as follows:
7(L+H*) + L%.

3.2.3 The Hijaaz MM

This melody is generally characterized as used very expressive and emotive. Therefore, it is used by Islamic chanters, Quran readers and the like (Al'adhami, 2010, p. 24). Fig. (4) shows the spectro-graphic analysis of this MM. The key note for this melody is 'aah'.



Aah aaaah aaaah

Figure 4: Spectro-Analysis of the Hijaaz Melody

In this MM, it is typical that the nuclear pitch accent is an H* on the last stressed syllable, followed by a L% boundary tone, and all pre-nuclear pitch accents are L+H*. This pattern leads into a terminal intonation in which the pitch decreases at the end.

The general equation for this melody is as follows:

4(L+H*)+ %L.

3.2.4 The Kurd MM

This MM is basically characterized as motivating and heroic. Thus, it is used by singers and chanters to express victory, zeal and bravery occasions (Al'adhami, 2010, p. 25). Fig. (5) Shows the spectro-graphic analysis of this MM. The key note for this melody is 'yaaba'.

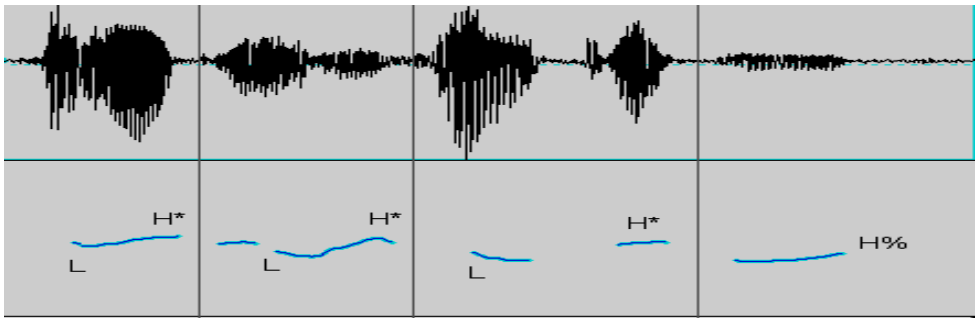


Figure 5: Spectro-Analysis of the Kurd Melody

The basic equation for this melody is:

3(L H*) + H%.

Fig. 5 shows a typical Kurd melody with the default L+H* pitch accents and the final H% boundary tone spreads over the last note (here the motif "laal"). There is a declination all through the utterance but with a much shorter downsteps. This reveals that the lower bound of the pitch range in Kurd is higher than that of the lower bound of the pitch range of other MMs. However, there is no difference between Kurd and Hijaaz as far as their upper bound of pitch was concerned. They only differ in the number of the tones preceding the terminal note. Moreover, the final tone in Kurd is High (H), whilst it is Low (L) in Hijaaz.

3.2.4 The Bayaat MM

This MM is characterized as the melody of love, passion and complaint. It is described as the vaster melody open to both singers and chanters. It can be calm as breeze and berserk as storm (Al'adhami, 2010, p. 27). Fig. (6) Shows the spectro-graphic analysis of this MM. The key note for this melody is 'awaili'.

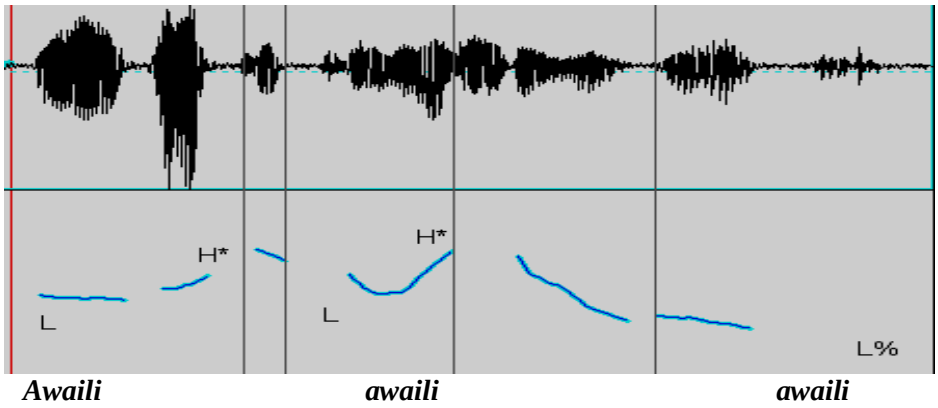


Figure 6: Spectro-Analysis of the Bayaat Melody

The tonal equation for this MM is as follows:

2(L H*) +L%.

Based on Fig. (6), a typical Bayaat melody consists of two intonational theme L+H*, which is followed by a terminal tone (L%). The register in which H tones are realized gradually narrowing across the theme or chorus, a tendency commonly noticed in the intonation of other MMs as well.

3.3 Discussion

In this subsection, the results of analysis will be discussed. The results of intonational features of the five MMs are shown in Table (1) below.

Table 1: Intonational Features of the Five MMs

MM	Number of pitch tones	Recurrent tone type	Leading initial tone	Trailing terminal tone
Rast	3H*	L	L	L%
Dasht	7H*	L	L	L%
Hijaaz	4H*	L	L	L%
Kurd	3H*	H	L	H%
Bayaat	2H*	L	L	L%

The recurrent tone type of all MMs is (L) "70%", except for the Kurd melody which has an H. This could explain the heroic effect of this melody. The recurrence of the High pitch tone will create such type of impact. On the contrary, the Low tone recurrence in Rast, Dasht, Hijaaz and Bayaat would justify the emotive and expressive value of such MMs. The other point that can be discussed in the results is that of the leading and trailing tones. It seems that all the MMs under analysis score L as an initial tone and L% as a terminal one. However, Kurd proves to be different again because it is trailed or terminated by an H%. This again gives it another motivating and heroic impact on the listener. The Low tones in other MMs prove their calmness, passion, emotion and melancholy/happiness. Moreover, Dasht scores the highest number of pitch tones, 7. Then, Hijaaz scores 4, followed by Rast and Kurd which score 3. Finally, the least of the melodies is Bayaat which scores 2 only. It seems that the least pitch tones a melody has the vastest variations it invokes. Thus, because the Bayaat melody has scored only 2 pitches, it has the highest effect and the largest variety in provoking feelings, emotions, and topics and so on. Additionally, Dasht is mainly related to happy topics and themes because it has more pitch tones than other melodies.

4. Conclusions

The study has come up with the following concluding remarks:

1. Intonation can be a useful tool for analyzing musical variations in the basic Iraqi MMs.
2. Musical intonation, which is the task of musicologists, is accompanied by phonological intonation to create the final form of the melody.
3. The number of pitch tones influences the emotive value of the MMs.
4. The recurrent pitch tone type affects the variations open to each melody.
5. There is an expressive impact made by the type of the initial and terminal tone in each melody.
6. The intonational behaviour of each MM can be symbolized by a tonal equation, which could be fruitful in teaching music.
7. In addition to previous functions of intonation, such as grammatical, semantic, and so on, it has a new one, namely 'musical function' because it gives music special effects and evaluations.

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