

## الملخص

تبحث الدراسة الحالية في تأثير الجنس على موسيقى الكلام (التنغيم) بالنسبة لنطق الصيغ المتداولة لألقاب التخاطب. فهي تبحث في ما إذا كانت هناك أية علاقة بين جنس المتحدث و مستواه التعليمي واستخدام أنماط تنغيمية معينة. يتكون عدد المشتركين من ٤٨ رجل و امرأة من متحدثي اللهجة العراقية في مركز مدينة البصرة. ينقسم المشتركين الى ثلاث مجموعات: متعلمين، متوسطي التعلم وغير متعلمين.

تم استخدام نظام هالدي للتنغيم (٢٠٠٨) لوصف الأنماط التنغيمية المستخدمة من قبل المشتركين. تم تحليل البيانات باستخدام برنامج برات ثم تم تحويل النتائج الى التحليل الاحصائي لايجاد اية فروق معنوية في اداء الرجال والنساء في النغمات الهابطة والصاعدة بالاضافة الى الجوانب العروضية المدروسة (مدى النغمة، شدة الصوت و الزمن). بين تحليل النتائج بأن النساء تميل أكثر من الرجال الى استخدام النغمات الصاعدة عند نطق الصيغ المتداولة لألقاب التخاطب. بالاضافة الى ذلك، تمتاز النساء بمدى عالي للنغمة يختلف عن الرجال بالنسبة للمقاطع الثنائية.

## Abstract

The current study explores the effect of gender on the music of language, i.e. intonation in relation to the pronunciation of address terms. It examines if there is any relation between the gender and educational background of the speaker and the use of certain intonational patterns. The participants are 48 men and women who are native speakers of Iraqi Arabic dialect spoken in the city center of Basrah. They are divided into three groups: educated, partly educated and uneducated participants.

Halliday's system of intonation (2008) is adopted to describe the intonational patterns pronounced by the participants. Data are analyzed using the Praat software and forwarded to statistical analysis in order to verify possible significant differences in the performance of men and women in the use of falling and rising tones and in the prosodic parameters evaluated (pitch range, intensity and duration). The analysis of the results reveals that women tend more than men to use rising tones on address terms. In addition, the pitch range of women is higher than that of men in relation to bisyllabic tonic segments.

**Key Words:** Gender Variation, Intonational Patterns, Address Terms, Spoken Iraqi Arabic

### Key to the symbols used

The following tables present the symbols used to transliterate Iraqi Arabic, adapted from Versteegh (2014: xiv -xv)<sup>1</sup>, together with their description following Ghalib (1984: xii-xiii).

Table (1): The Consonants

Transliteration	IPA Symbol	Description	Example	Meaning
ʔ	[ʔ]	A Glottal Stop.	ʔaḥm	red
b	[b]	A voiced bilabial plosive.	bint	girl
t	[t]	A voiceless denti-alveolar	tīn	fig
t̪	[θ]	A voiceless inter-dental	tūm	garlic
ǧ	[dʒ]	A voiced palato-alveolar	ǧār	neighb
ḥ	[h]	A voiceless pharyngeal	ḥilim	dream
ḫ	[x]	A voiceless uvular fricative.	ḫādi	servan
d	[d]	A voiced denti-alveolar plosive.	dīn	religio
d̪	[ð]	A voiced inter-dental fricative.	d̪anb	sin
r	[r]	A voiced alveolar flap.	rāḥa	rest
z	[z]	A voiced denti-alveolar	zilzāl	earthq
s	[s]	A voiceless denti-alveolar	sin	tooth
š	[ʃ]	A voiceless palato-alveolar	šamʿ	candle
č	[tʃ]	A voiceless palato-alveolar	čāy	tea
ṣ	[s]	A voiceless denti-alveolar	ṣafḥ	page
ḍ	[d̪]	A voiced denti-alveolar	ḍēf	guest
ṭ	[t̪]	A voiceless denti-alveolar	ṭīn	clay
ḍ̪	[ð̪]	A voiced inter-dental emphatic	ḍ̪il	shado
ʕ	[ʕ]	A voiced pharyngeal fricative.	ʕinab	grape
ǧ	[ɣ]	A voiced uvular fricative.	ǧāʾib	absent
f	[f]	A voiceless labio-dental	fustā	a dress

q	[q]	A voiceless uvular plosive.	qary	village
k	[k]	A voiceless velar plosive.	karī	genero
g	[g]	A voiced velar plosive	gi'ad	to
l	[l]	A voiced alveolar lateral.	laḥa	meat
l̥	[l̥]	A voiced alveo-dental lateral,	šūgu	work
m	[m]	A voiced bilabial nasal.	mift	key
n	[n]	A voiced denti-alveolar nasal.	nabi	prophe

- 1 There are two modifications in the consonant letters; ḥ is used instead of h to represent [x], because when it occurs in the tonic it loses its identification, and ʔ is used to represent ʔ instead of ʔ which is partly similar to ʔ that represent ʔ

h	[h]	A glottal fricative.	haw	air
w	[w]	A voiced velar approximant.	ward	flower
y	[y]	A voiced palatal approximant.	yad	a hand

Table (2): The Vowels

Symbol	Description	Example	Meaning
i	A short half-close front with lip	ʔiḡlis	sit down
ī	A long close front with lip spreading	fiḡl	elephant
ē	A long half-close to half-open front	rēḡān	basil
a	A short half-open unrounded vowel	ʔarnab	rabbit
ā	A long open front unrounded vowel	nāʔim	asleep
u	A short half-close back rounded	kursi	a chair
ū	A long close back rounded vowel	rūḡ	soul
ō	A long half-close to half-open back	mōḡa	ice-

## **1. Introduction**

The current study is an acoustic investigation of the intonational patterns used on address terms in Iraqi colloquial Arabic, I.C. henceforth, spoken in the city centre of Basra. It aims to examine gender variation in the use of various intonational patterns and their acoustic measures, mainly pitch range, intensity range and duration. The general aim is to see whether men and women of the same educational level use the same intonational patterns on address terms and with approximate frequency and acoustic measures or not.

During interaction, a speaker uses various types of address terms to call his addressee. Such linguistic choices provide clues to social factors such as the relationship between the people in the situation and how the speaker feels about the person addressed. Just as vocabulary conveys social information, so using different pronunciation conveys social information too; a great deal depends on intonation and tone of voice (Laplante and Ambady, 2003:434-35).

The cultural values of femininity and masculinity are conveyed by tunes and their variants. Women tend more than men to use high rising terminals during speech. Also, a relatively wide pitch range with frequent and rapid long glides is central to the stereotype of feminine speech. Speakers use intonational patterns to indicate their

emotional involvement, attitudes and general stance in a conversation. The greater the range of pitch used, the greater the perceived expression of emotion. Women are more aware of the communicative needs of their partners in conversation, and thus produce more exaggerated intonation to achieve the interactional goals. Furthermore, even if people have common regional origin they may have different social backgrounds because of different education or occupation and that is indicated by speech (Daly and Warren, 2001: 85, 88, 93-94; McConnell-Ginet, 2011: 108 and Holmes, 2013:3-4, 284).

Cruttenden (1986:3) highlights fundamental frequency (F0) variation between men and women; men have lower frequency values (60Hz to 240Hz) than women's (180Hz to 400Hz). Rate of vibration of the vocal cords is reflected in the acoustic measurement of fundamental frequency. This term refers to the number of repetitions of the regular waveform within one second, such a regular waveform being typically produced when the vocal cords vibrate for voicing (Cruttenden, 1986:3).

## **2. Address Terms**

The choice of a particular linguistic form in a particular situation depends on a number of factors, including the social distance between participants, their relative status, and the formality of the context. The dimensions of solidarity (or social distance) and social

status (or power) are at the heart of polite behaviour. Politeness is not a matter of saying 'please' and 'thank you' in the right places, but it is a complex matter in any language; it involves understanding not just the language, but also social and cultural values of the community (Holmes, 2013:279, 283-284).

Being polite means getting the linguistic expression of social distance right as far as the addressee is concerned. The choice between Layla and doctor Layla involves consideration of this dimension, where the first term indicates high solidarity and intimate relationship whereas the second reveals low solidarity and distant relationship.

Another influencing scale is the formality scale. This scale is useful in assessing the influence of the social setting or type of interaction on language choice. A range of names might be used to address the same person depending on the situation. For example, different addressing terms might be used by a person to address his mother when talking to her in a family gathering, in front of strange people or talking of her in front of others (Holmes, 2013: 14). Also, linguistic choices when talking to the dean of college in academic settings won't be the same in a friendly chat; more colloquial and intimate terms are used in the second situation.

The last scales identified by Holmes (2013: 10-11) are the referential and affective function scales. Language

can convey objective information of a referential kind; and it can also express how someone is feeling. The more referentially oriented an interaction is, the less it tends to express the feelings of the speaker.

In Arab culture, the use of honorifics is very important in the communication of politeness. The name of a person is combined with a title of some kind, for example, 'brother Mohammed' or 'Mohammed brother'. To be more polite, a person's title or profession is used. In addition, it is very common for people (younger males, old, and married) to be addressed as " 'abū X" 'father of X' or " 'um X" 'mother of X', and the old prefer to be addressed with these titles than by their proper names (Samarah, 2015: 2011).

### **3. Intonation**

Intonation is the music of speech (Anis, 1971: 103). When one speaks, one makes continuous rises and falls in the pitch of the voice to produce a certain effect on the addressee. It is a feature of everyday spoken language; it contributes fundamentally to the flow of discourse (Halliday and Greaves, 2008: 97). It is perceived as a rhythmic structure overlaid on a complete utterance. The main perceptual cues are pitch and volume changes over the course of an utterance (McConnell-Ginet, 2011: 110). The term 'pitch' refers to the fundamental frequencies of successive syllables in an utterance. It is used to describe



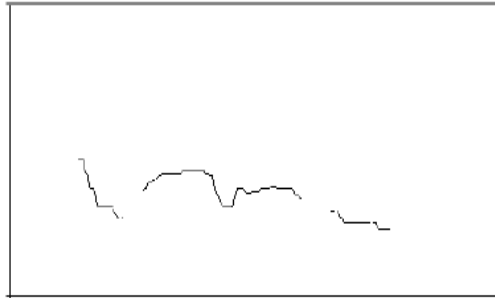
the effect of vibration in the vocal cords, with slower vibration making voices sound lower and rapid vibration making voices sound higher (Al-Ani, 1970: 90-91; Walker, 2013: 457).

Al-Ani (1970: 90-91) distinguishes four levels of pitch that operate in the intonational system of Iraqi Arabic. These are identified with the numbers /1/ - low, /2/ - mid, /3/ - high, and /4/ - extra high. These four levels of pitch are relative rather than absolute. Functional words — particles and prepositions — and suffixes and prefixes do not receive pitch levels /3/ or /4/ when they are contained in utterances of more than one lexical item. However, they may receive pitch level /3/ when in isolation.

Ghazali et. al. (2007: 114) remark that statements in Iraqi colloquial Arabic (I.C.) are frequently uttered with the falling tone:

<sup>ʔ</sup>ilġaw bārid ilyōm.      ‘It is cold today’

In I.C. it is seldom to find one-pitch accent contours, and the typical patterns are intonation contours with continuous pitch variations on the syllables that bear lexical stress. Syllable prominence is achieved either through pitch rise or pitch fall. In general, the salient feature of I.C. Arabic dialect is the predominance of peaks and valleys within the contour, which leads to a continually changing melody (Ghazali et. al., 2007: 114-115). The following Figure illustrates:



**Figure (1): 'ilḡaw bārid ilyōm.**

In his study of Zubairi Arabic dialect, Ahmad 1987 (as cited in Gatta, 1988: 25-26) distinguished three types of tones: simple, complex and compound. Simple tones are either kinetic or static. The kinetic tones are classified into falling tones and rising tones. There are four types of falling tones: high falling tones, low falling tones, high mid falling tones and emphatic high falling tones. The rising tones, on the other hand, are of two types: high rising tones and low rising ones. Static tones are of two types: high level and low level. In addition, complex tones include falling-rising tones and rising-falling tones.

Ahmad 1987 (as cited in Gatta, 1988, 26) distinguished four types of compound tones: high fall+ high fall, high fall+ low fall, high fall + low rise, and high fall + high level. He said that these are the most common and frequent ones.

According to the semantic content of an utterance, intonation serves several functions (Wells, 2006: 11-12)

1-Attitudinal function: Intonation expresses attitudes and emotions; it shows shock or surprise, pleasure or anger, etc by the appropriate use of tone.

2-Accentual function: Intonation helps to show what information in an utterance is new and what is already known. Accentuation is combined with the choice of tone to present some longer stretches of the message as constituting the foreground while leaving other stretches as background. These are pragmatic functions.

3-Grammatical function: Intonation helps identify grammatical structures in speech as does punctuation in writing. It provides information such as the placement of boundaries between phrases, clauses or sentences; it distinguishes clause types, such as question vs. statement, and disambiguates various grammatically ambiguous structures.

4- Discourse function (or cohesive function): Intonation signals how sequences of clauses and sentences go together in spoken discourse, to contrast or to cohere. It signals whether a speaker desires to continue his talk or ready to give another speaker a turn.

5-Psychological function: Intonation segments speech into units that are easy to perform, process and memorise.

6-Indexical function: Along with other pronunciation features, intonation serves as a marker of personal or social identity. What makes mothers sound like mothers,

lovers sound like lovers or officials sound like officials is partly their characteristic intonation.

The following is an account of the intonational framework adopted in this study.

### **3.1 The Intonational System of M.A.K. Halliday (2008)**

In his study of the intonation of spoken English, Halliday (1967, 1970 and 2008) provides a comprehensive model of intonation where language is seen as the primary system of meaning. The higher phonological unit is the tone unit that matches the information unit, i.e. the unit of lexicogrammar (Halliday and Greaves, 2008: 14, 41).

The tone unit consists of one obligatory element, the Tonic, together with one optional element, the Pretonic. The Tonic element carries the defining pitch contour of the tone unit; and this may be either 'simple' (one contour) or 'compound' (two contours). Phonetically, the onset of the Tonic is marked by a kind of prominence, often heard as loudness (called in phonemic theory as "primary stress"). However, Tonic prominence is mainly a matter of pitch movement for it is the place where the greatest amount of pitch movement occurs, in relation to the range of pitch change on the tone unit. The Tonic prominence is allocated to one particular salient syllable, which stands out because of its combination of amplitude,

duration (timing), and change of pitch along one or other of the (tone) contours. This particular syllable is called the “tonic syllable”. The tonic syllable marks the beginning of the Tonic element of the tone unit (Halliday and Greaves, 2008: 53-54). A tone unit consists of one or more feet, a foot of one or more syllables, and a syllable of one or more phonemes. There is a tendency for salient syllables to occur at fairly regular intervals, and this affects the syllables in between: the more of them there, the more they will be squashed together to maintain the tempo (Halliday and Greaves, 2008: 55).

Four phonological levels are involved in making meaning through intonation:

Tonality is the “distribution of utterance into tone units, with location of boundaries”;

Rhythm is the “distribution of utterance into feet (metric units) with location of boundaries”;

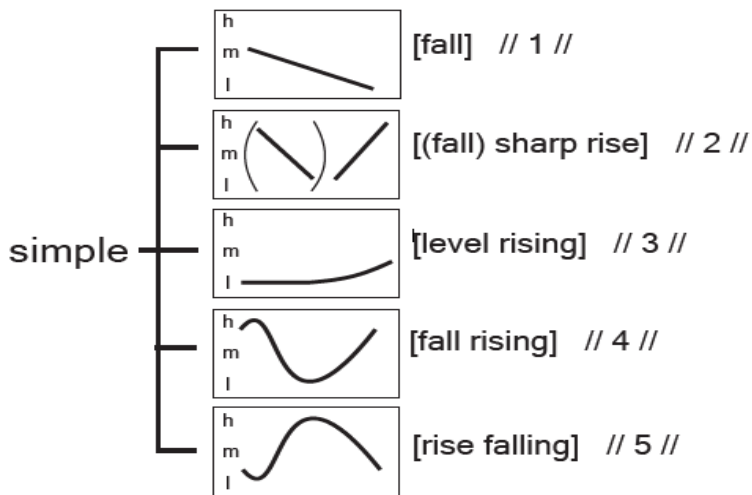
Tonicity is the “distribution of utterance into Tonic and Pretonic, with location of tonic foot” and

Tone is the choice of primary and secondary tone.

These are phonological systems; but they function directly as the realization of systems in grammar (Halliday and Greaves, 2008: 210). The following section explores the last phonological level in details.

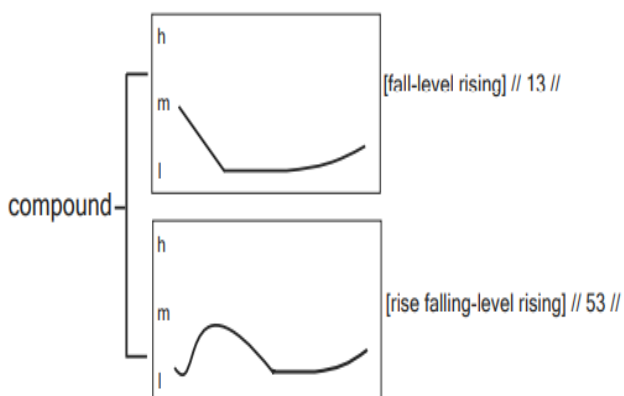
### 3.1.1 Tone

Halliday (2008) distinguishes seven primary tones: five simple tones and two compound tones. The simple tones form a set of five shapes: that is, if a tone unit has only one focus, it will always assume a phonetic shape interpretable as one of these five tones (Halliday and Greaves, 2008: 45). These simple tones are presented in Figure (2):



**Figure (2): The Five Simple Primary Tones**

The compound tones, on the other hand, form a smaller set. There are two: fusions of tones 1 and 3 and of tones 5 and 3. (The number symbols are thus read as 'one three' and 'five three', not 'thirteen' and 'fifty three') (Halliday and Greaves, 2008: 46). Figure (3) below illustrates:



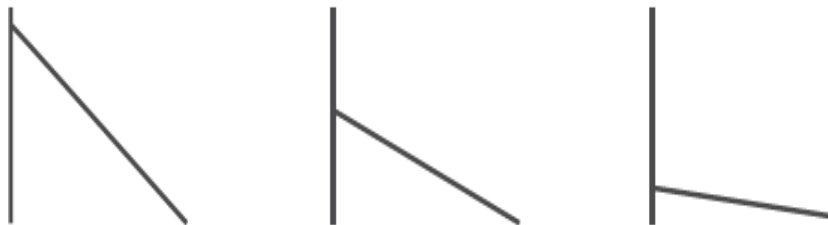
**Figure (3): The Two Compound Tones**

There is a great deal of variability within each one of these primary tones. The sets of finer and more delicate tonal categories are called “secondary” tones (Halliday and Greaves, 2008: 164). The following is a consideration of each tone.

### **Tone 1**

Tone 1 is a falling tone. It has three variants in the Tonic segment and three in the Pretonic. The first variants are called direct secondary tones because they are directly related to the Tonic whereas those related to the Pretonic are called indirect secondary tones. The neutral type for the Tonic, symbolised as “1.”, is that which begins at about mid or mid-high levels of pitch and ends on a low pitch. The neutral pretonic has an ‘even contour’ that remains level at about mid or mid-high or may have a descending or an ascending form or it may be a combination of an ascending movement followed by a

descending one (Halliday, 1970: 10; Halliday and Greaves, 2008: 165). Thus, “in the neutral tone 1. the tonic starts at the same pitch as the end of the pretonic, without jumping up or down; while in the marked options there is a jump in pitch at this point, up jump with 1+, down jump with 1-” (Halliday and Greaves, 2008: 171). Thus the marked options of Tone 1. may be high falling “1+” or low falling “1-” according to where it starts. Since all these variants end low, and all take the same amount of time, the movement in pitch with the high fall is steeper than that with the low (Halliday and Greaves, 2008: 165, 171) . Schematically, the three variants are represented as:

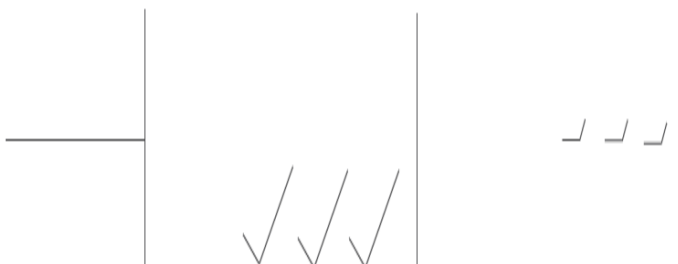


**Figure (4): The Direct Secondary Tones of Tone 1**

This particular set of alternatives (shown in the notation as 1+ 1. 1-, respectively) is known as the system of declarative key, having the three terms “strong”, “neutral” and “mild” (Halliday and Greaves, 2008: 169-170).



The Pretonic of Tone 1 has three variants: it may be steady, bouncing or listing. The following is a schematic representation of the movements (Halliday and Greaves, 2008: 165, 171-172):



**Figure (5): The Indirect Secondary Tones of Tone 1**

These are represented as (.1, -1, ...1 respectively). In the bouncing or “insistent” Pretonic, each foot displays a particular movement: a bouncing movement starting from a low, dipping tone and going rapidly up to about mid-high (Halliday and Greaves, 2008:171-172), It is represented schematically as:



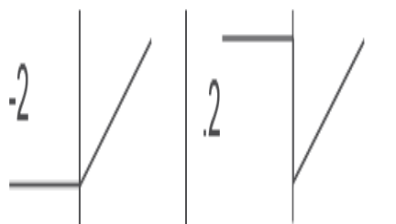
**Figure (6): The Bouncing Pretonic of Tone 1**

The “listing” pretonic, on the other hand, is actually a succession of two or more rising movements enumerating the non-final items in a list. It is clearly related to a sequence of tone 3 tone units; but here the pitch is usually higher (high rising rather than low rising), and the grammatical unit that is mapped into each rising segment is a word, group or phrase rather than a clause. This listing pretonic can also occur with tone 2 but less frequently.

## **Tone 2**

The neutral unmarked tonic of tone 2 “2.” is a straightforward rising tone. The unmarked location is on the final lexical element in the tone unit. The sharp fall-rise “2”, on the other hand, is a combination of a falling tone 1 with a rising tone 2; the fall-rise signals something like “I’m telling you: this is what I want to know”; it adds further specification of the focal point of the query. The fall-rise may be spread over more than one foot, in which case it could be interpreted as two tone units, a tone 1 followed by a tone 2. Nevertheless, the whole usually forms a single information unit (Halliday and Greaves, 2008: 174-175).

The neutral variant of the Pretonic of tone 2 “.2” is high and tends to be fairly level. The ‘involved’ variant “-2”, is also fairly level, but maintained at a low pitch (Halliday and Greaves, 2008:175). These are represented schematically as follows:



**Figure (7): The Pretonics of Tone 2**

The involved variant of tone 2, i.e. “-2”, which is called the high rising tone HRT, is sometimes used on statements to answer an information seeking question. It is the type of tone criticized by Lakoff 1975 (as cited in McConnell-Ginet, 1978: 554) as “an inappropriate question intonation” used by women. Nevertheless Halliday and Greaves (2008: 176-177) maintain that this rising tonic carries a prosody of “get it?” or “is that what you wanted to know?” and the choice of low rather than high pretonic, in the case of -2, avoids the strongly interrogative flavour of the sequence high level plus high rising.

### **Tone 3**

Tone 3 is phonologically a level tone (that is, neither falling nor rising). Nevertheless, it is always realized phonetically as a low rising contour (Halliday and Greaves, 2008: 178). There are no secondary distinctions of a “direct” kind but the range of phonetic variation is

considerable, from a barely perceptible rise which may be audible only when the sound is slowed down to one that is indistinguishable from a tone 2.

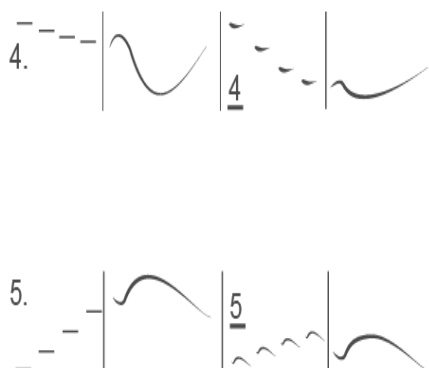
Within the 'indirect' secondary tone system, there are two terms realized by distinct types of pretonic: the unmarked (mid level) .3 and the marked (low level) -3. Like the pretonic variants of tone 2, these tend to remain fairly steady in pitch, and they correspond in principle to the two end points of the tonic.

Tone .3 may give the impression of "this is an additional, minor point", as in compound tones 13 and 53; or, when occurs by itself, it may mean "I'm uncommitted". The fact that it rises puts it on the side of uncertainty, as opposed to the certainty implied by a fall (Halliday and Greaves, 2008: 178).

Tone -3 is a marked variant that imports an air of casualness (Halliday and Greaves, 2008: 179).

### **Tones 4 and 5**

The complex tones 4 (falling-rising) and 5 (rising-falling) have one secondary tone system, having an unmarked term which is mid to high (4., 5.) and a marked term which is low (4, 5). In both cases the distinction is a gradual one, affecting mainly the tonic but also the pretonic profile. The difference is presented schematically as follows (Halliday and Greaves, 2008: 179-180):



**Figure (8): The Secondary Tone Systems of Tone 4 and Tone 5**

In the low variety, each pretonic foot tends to foreshadow the tonic by mimicking its basic outline. In addition, the low 5 (but not the low 4) tends to have a breathy quality associated with it. In their discourse functions, tones 4 and 5 are very different. Tone 5, which (like tone 1) ends on a fall, tends to be independent and final. Tone 4, which (like tone 2) ends on a rise, tends to be dependent and non-final.

#### **4. Research Hypotheses and Methodology**

This section presents the hypotheses of the research and the methodology adopted. It provides a detailed description of participants, dialect under study and the methods used to collect and analyse the data of the study.

##### **4.1 Hypotheses**

The study hypothesises that men use falling tones more than women; women use rising tones more than men; the pitch ranges of women are higher than those of

men; and the closer men and women are in educational level the less variation appeared between them in intonational patterns and acoustic measures.

## **4.2 Participants**

Forty eight men and women participate in this study. They are divided into three groups: educated, partly educated and uneducated participants. Each group includes sixteen participants: eight men and eight women. They are given an information sheet to register their personal information, including name, date of birth, place of birth, residence and educational status. According to the information given, all participants are born and raised in the city centre of Basrah

Educated participants (Edu.Ps) involve those who completed their diploma, bachelor or higher studies. Partly educated participants (Pedu.Ps), on the other hand, include sixteen participants with primary or secondary school levels. Uneducated participants (Unedu.Ps), consist the last group of participants without any level of education.

## **4.3 Dialect under Study**

Arabic has three major varieties: classical Arabic which is the language of the Holy Quran and pre-Islamic literature; colloquial dialects which are spoken in different countries of the Arab world, and modern

standard Arabic which is used in publication, the media and in academic institution (Khalil 2010, in Abushihab, 2015: 2020). Iraqi Arabic dialects were classified by Blanc (1964: 5-6) into two main groups: qeltu-dialects and gelet-dialects. The latter are spoken by the Muslim population (sedentary and non-sedentary) of Lower Iraq, and by the non-sedentaries in the rest of the area; the former are spoken by the non-Muslim population of Lower Iraq and the sedentary population (Muslim and non-Muslim) of the rest of the area. The gelet dialects are closely related with the Bedouin dialects of the Shamiyya, on the one hand, and the dialects of Kuwait, Khuzestan, and the Arab Gulf area on the other. Ingham (1997: 13-14) remarked that Southern 'gelet' is characteristic of the region of Basrah, Nasiriyah and Umarah.

The dialect under investigation is that spoken in the city center of Basrah by men and women who have been born and raised in the city center.

#### **4.4. Data Collection and Recording Technique**

This study is based on the recordings of spontaneous speech. The speech recorded involves everyday speech at home, work, family visits and call recordings.

The tool used for recording is Sony IC Recorder, ICD-PX333. The total time of recorded speech is 77 hours, 49 minutes and 06 seconds. These are divided into 12:21:16 by educated men (Edu.M), 13:56:54 by educated women

(Edu.W), 14:05:00 by partly educated men (Pedu.M), 14:21:30 by partly educated women (Pedu.W), 12:13:53 by uneducated men (Unedu.M) and 10:50:33 by uneducated women (Unedu.W).

#### **4.5 Acoustic Analysis**

Acoustic analysis is an instrumentally carried out analysis. It is done to supplement and support auditory judgments. Data are analysed using the Praat (2018 latest version 6.0.43) software. Praat, a Dutch word for 'talk', is a speech analysis computer program that was developed by Phonetics Department at the University of Amsterdam under the direction of Paul Boersma and David Weenink (2008) (Jolayemi, 2013:3). This program is used as a visual technology support to measure different intonational patterns. It shows a screen with the pitch contour of the uttered sentence displayed in blue. Within its multiple features, Praat can produce spectrogram analysis, pitch analysis (including minimum and maximum pitch, pitch listing and pitch range), formant analysis, intensity analysis (including minimum and maximum intensity) and duration.

In Praat, setting the floor of the pitch range is a technical requirement for the pitch analysis. The standard range is from 75 to 500 hertz, which means that the pitch analysis method will only find values between 75 and 500 Hz. The range is shown to the right of the analysis



window. For a male voice, the floor is set to 75 Hz, and the ceiling to 300 Hz; for a female voice, the range is set to 100-500 Hz instead. For creaky voice, the range is set much lower than 75 Hz (Praat, 2018). Sometimes, the pitch range is set to other levels when these ranges catch the intonational patterns produced by the participants better than the ranges suggested by the programme. Sometimes, mixed talk or the low voice of the speaker makes it difficult to get a clear spectrogram of the tone. Thus, such examples are given without a spectrogram.

In addition, the current study uses the free digital audio editor (Audacity) which has been used to edit and cut the samples recorded of the participants.

Because everyday spontaneous speech may include cut off sentences or mistakes in pronunciation because of haste or hesitation, such utterances were dealt with by putting the proper substitution between brackets. Also, lengthening of a syllable is indicated by colons (:, ::, :::), and high pitched speech is referred to by (<<falsetto>>). In addition, unrelated speech or unclear speech is discarded using three dots.

### **4.6 Statistical analysis**

For the statistical analysis, the Mann-Whitney U Test is used, in order to verify possible statistically significant differences in the performance of men and women in the three educational groups. The statistical package IBM

SPSS (Statistical Package for Social Sciences), version 24.0, is used to obtain the results.

The significance level of 5% (0.05) is used for the statistical test. When the value of the calculated significance (p) is lower than 5% (0.05), there is a 'statistically significant difference', that is, there is an 'effective difference'. When the calculated significance (p) value is equal to or higher than 5% (0.05), a 'statistically non-significant difference' is found, that is, there is 'similarity'.

## 5. Results

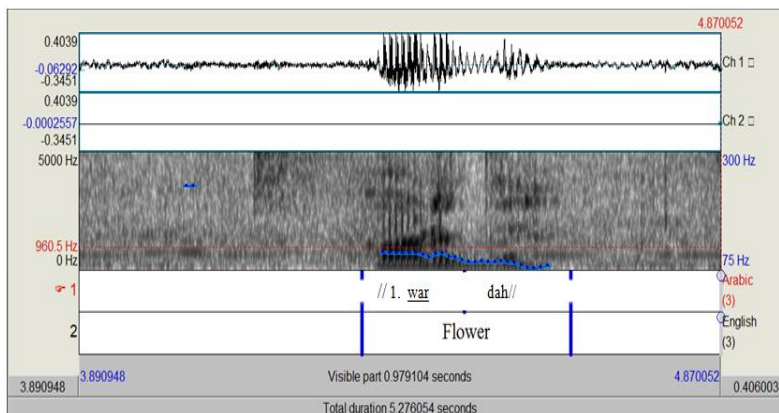
After collecting the recorded speech of the participants, the speech was transcribed and acoustically analysed to examine the performance of the participants, mainly the intonational patterns used, pitch range, intensity range and duration.

The participants use various types of address terms. Affectionate terms and nicknames, first names, terms related to family members, religious and formal terms are used to address close friends, colleagues, relatives, family members and strangers. These address terms sometimes occur as the tonic of the tone unit, or as non-tonic.

Address terms are pronounced by Edu.M on tone 1 (1., 1+), 3 (3, -3, -3<sup>H</sup>), 5 or 53 (53):

## Gender Variation Elicited in the Intonational Patterns of Address Terms in Everyday

1. P.7, a librarian, addressed a female student at the end of their interaction “// 1. wardah// ‘Flower’”.



**Figure (9): Tone 1 by Edu.M 7**

The spectrogram shows in a blue line the falling tone on the tonic and the following syllable continuing the fall. The acoustic analysis of this example approves the falling pattern; the pitch recorded in Hertz (Hz) falls from fundamental frequency (F0) 107.93Hz to 78.95 Hz. The minimum and maximum intensity registered in decibels (dB) are 67.62 and 76.14 respectively, and the duration is 0.24 seconds (s).

2. P.6 parted a relative “// 5 fīmāl/lā // 1+ ḥağ/giyya// ‘Be in Allah’s safety, hajjia’”.

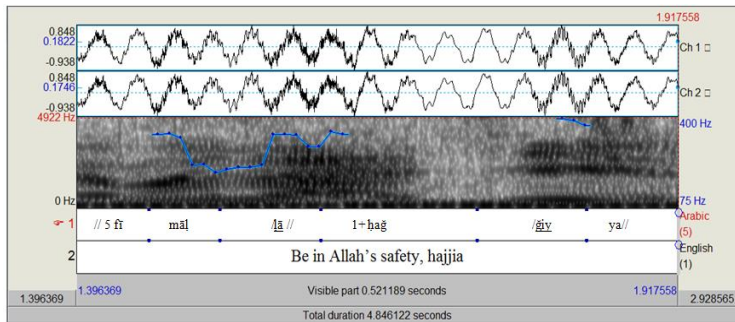


Figure (10): Tone 1+ by Edu.M 6

The pretonic of the address term ends at F0 336.71 Hz, and the tonic segment starts higher in pitch, i.e. F0 388.57 Hz and falls to 366.10 Hz. The minimum intensity registered is 85.17 dB and maximum intensity is 87.30 dB. The address term takes a duration of 0.30 s. F0 and intensity values registered for tone 1+ are higher than those registered for the neutral variant of the tone (1.).

3. P.5 addressed his colleague while asking him a question “// 5 ḥa/līl // 2 ham /zēn// <sup>^</sup>ʔu/bu: - (0.1)// 3 <sup>ʔ</sup>u/boḥmad// ‘Is Khaleel also good, Ahmad’s father?’”

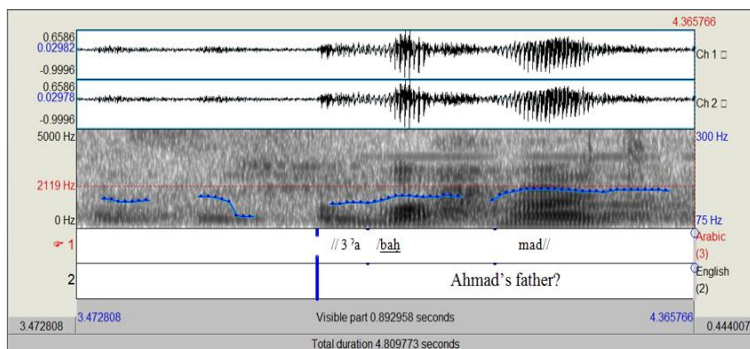
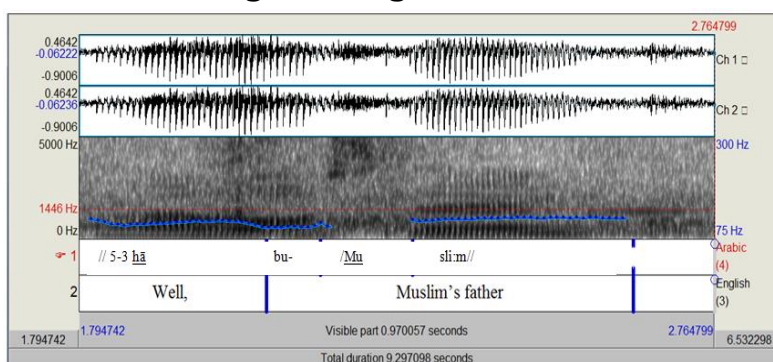


Figure (11): Tone 3 by Edu.M 5

The pitch list in Praat identifies the pretonic to start on F0 130.30 Hz and continues to 133.80 Hz where the tonic starts on F0 133.22 Hz and takes a very slight fall to 132.07 Hz then rises again to 135.22 Hz and continues a gradual rise to 164.34 Hz. The tonic segment (tonic and following syllable) takes 0.51seconds (s) and the minimum and maximum intensity registered are 68.85 dB and 83.14 respectively.

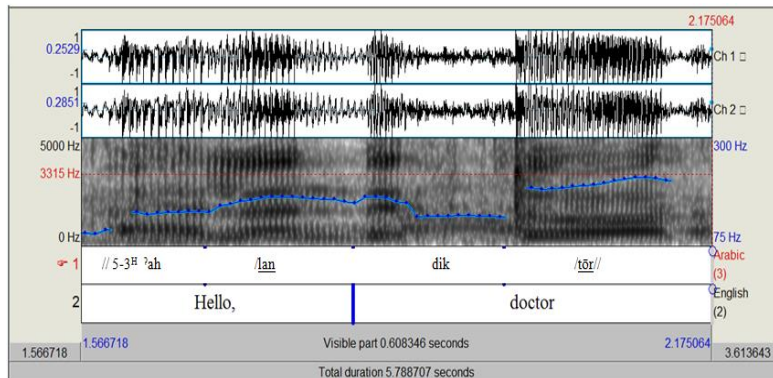
4. P.5 greeted a man “// 5-3 hā bu-/Musli::m// ‘Well, Muslim’s father’”. The term of address takes tone -3, a level tone ending with slight rise.



**Figure (12): Tone -3 by Edu.M 5**

The tonic starts at 99.40 Hz and continues a level to a slight rising movement with the values in Hz: 120.83, 120.55, 120.86, 122.07, 121.68, 120.59, 120.75, 120.54, 120.95 and 121.56. The tonic segment takes a duration of 0.53 s and a minimum and maximum intensity of 70.23 dB and 82.58 dB respectively.

5. P.8 replied to a male customer “// 5-3<sup>H</sup> ʔah/lan dik/tōr// 5 ʔah/lan// 5 šō/nak// 5 šōn /šiḥtak// ‘Hello, doctor’”.

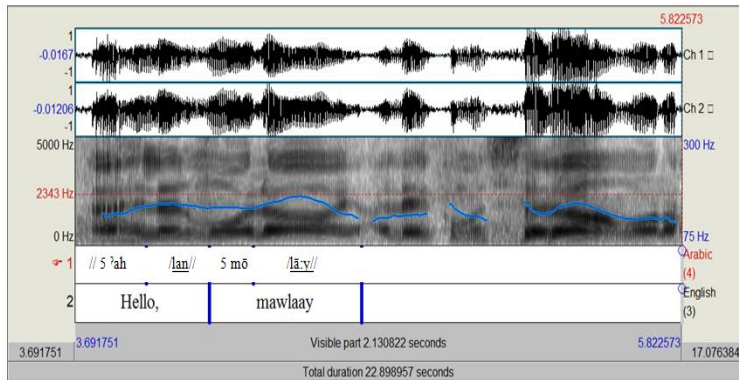


**Figure (13): Tone -3<sup>H</sup> by Edu.M 8**

The pretonic of the address term ends at F0 163.74 Hz and the tonic starts at 195.32 Hz and ends at 218.08 Hz. The tonic starts higher than the preceding foot and, unlike tone -3 which takes a level movement with a slight rise, it takes a high rising movement. In the current example, the tonic rises with F0 values 195.32, 193.01, 194.80, 196.52, 198.53, 200.82, 203.10, 206.50, 214.58, 217.38, 218.08. The tonic takes a duration of 0.18 s and the minimum and maximum intensity registered are 79.12 dB and 88.30 dB respectively.

6. P.8 replied to a greeting “// 5 ʔah/lan mō/lā:y// 5 ʔa/laykum issa/lām// 5 w raḥma/tallā w bara/kāt// 5 ḥay/yākum /alla// ‘Hello, mawlay. Peace be upon you and Allah mercy and blessings. Allah welcomes you’”.

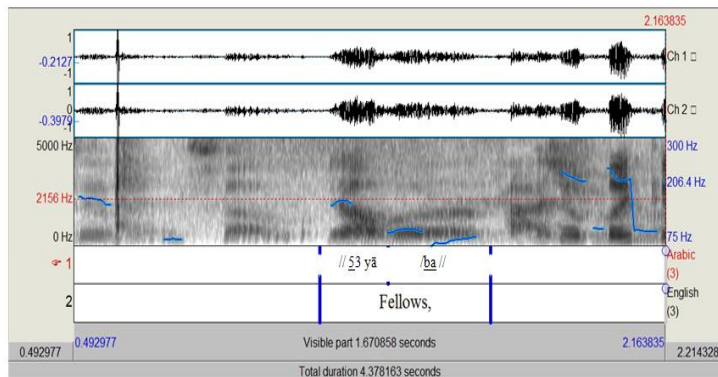
**Gender Variation Elicited in the Intonational Patterns of Address Terms in Everyday**



**Figure (14): Tone 5 by Edu.M 8**

The tonic starts at F0 151.92 Hz and rises to 176.32 Hz then falls to 138.77 Hz. The tonic takes a duration of 0.37 s and 74.25 dB and 86.49 as minimum and maximum intensity respectively.

7. Before inviting his relatives on dinner, P.2 addressed them on tone 53 in “// 53 yā/ba // 1 tʔaššu /hnā// ‘Fellows, have dinner here’”

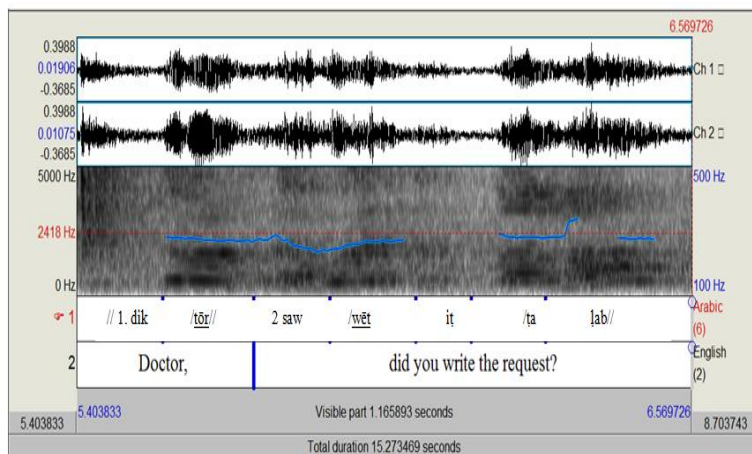


**Figure (15): Tone 53 by Edu.M 2**

The rising falling movement in the tonic segment is imitated in the pretonic; it starts at 153.29 Hz and rises to 169.34 Hz then falls to 167.48 Hz. The first part of the tonic, i.e. tone 5, on the other hand, takes a movement from 102.98 Hz to 110.11 Hz and ends at 105.92. Tone 3 starts at 80.16 Hz and steps down to 79.26 Hz where it starts a rising movement to reach 89.54 Hz. The duration taken by the address term is 0.41 and the minimum and maximum intensity values are 60.87 dB and 79.13 dB respectively.

During their speech, Edu.W use various types of address terms pronounced on tone 1 (1., 1+), 3 (3, -3, 3<sup>H</sup>), 5 or 53:

8. P.3 asked her colleague “// 1. dik/tōr// 2 saw/wēt it/ṭalab// ‘Doctor, did you write the request?’”



**Figure (16): Tone 1 by Edu.W 3**



F0 of the tonic ranges from 283.87 Hz to 268.10 Hz. So, it is clearly a falling tone. The tonic takes a duration of 0.15 s and the minimum and maximum intensity registered are 60.82 dB and 77.15 dB respectively.

9. P.6 asked her brother’s child “// 53 lěš// 13 lěš /mālič /ħilg ħa/yāti// 1+ baṭ/tah// ‘Why? Why don’t you feel Ok? Duck’”

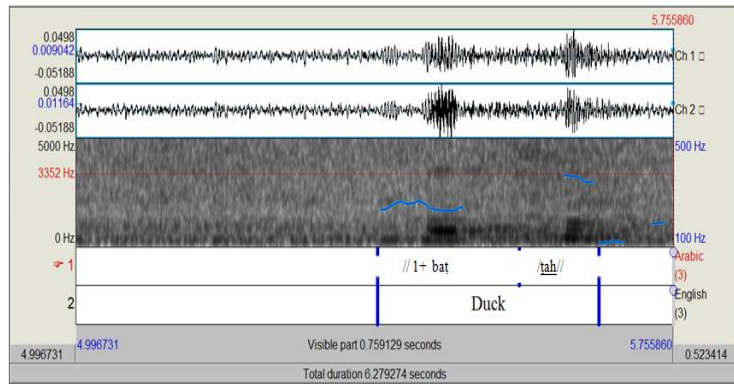
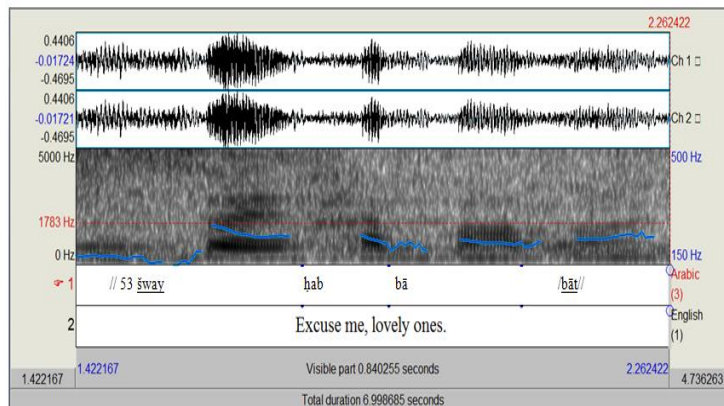


Figure (17): Tone 1+ by Edu.W 6

The tonic is said on a falling tone with a starting point higher than the end point of the pretonic, and thus is represented by (1+). The pretonic ends at 248.54 Hz and the tonic starts its falling movement higher than this value, starting from 361.23 Hz and descending to 336.51Hz with a duration of 0.4 s and minimum and maximum intensity 54.45 dB and 59.36 dB respectively.

10.P.2 asked female students to move aside to open a room “// 53 šway ħabbā/bāt// 1 šway ħil/wāt// ‘Excuse me, lovely ones. Excuse me, beauties’”. The affectionate term occurs as the tonic of the second part

of the compound tone, i.e. tone 53. Tone 3 is a slightly rising tone that starts lower than the preceding foot as illustrated in Figure (20) below.

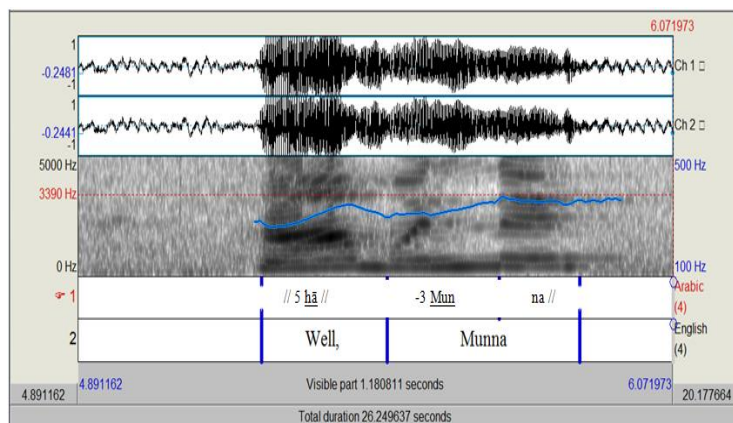


**Figure (18): Tone 53 by Edu.W 2**

In the above spectrogram the floor is set to 150 because it better shows the tone movement. The pretonic ends at F0 233.54 Hz and the tonic starts its low rising movement starting at F0 170.31 Hz and ending to 192.14 Hz. The tonic takes duration of 0.40 s and the minimum and maximum intensity registered are 64.08 dB and 74.63 dB respectively.

11. P.6 called at her colleague “// -3 ʔağ/ğī// ‘hajji’ before asking him a question.
12. On the phone, P.2 greeted her sister “// 5 hā // -3<sup>H</sup> Munna // 5 halaw ʔa/bīti-š // 5 šōnič// ‘Well, Munna. Hello, my love. How are you?’”

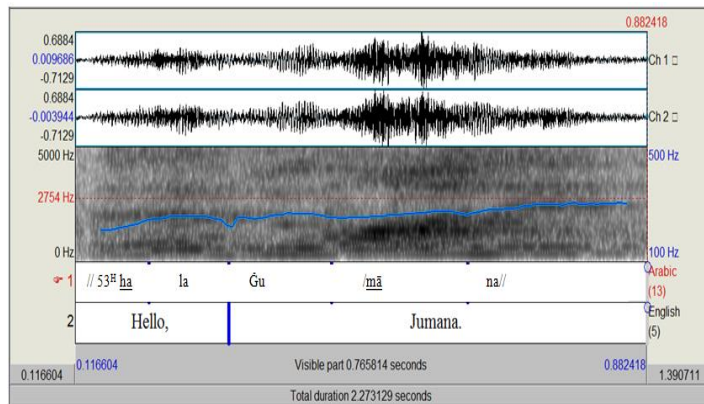
## Gender Variation Elicited in the Intonational Patterns of Address Terms in Everyday



**Figure (19): Tone -3<sup>H</sup> by Edu.W 2**

Tone -3<sup>H</sup> is especially added by the researcher to satisfy the needs for appropriate symbols to describe the intonation of Iraqi Arabic. The tonic of tone -3<sup>H</sup> starts at the pitch level of the preceding foot or above and takes a gradual high rising movement. In this example the pretonic ends at F0 294.09 Hz and the tonic starts at 294.27 Hz and rises gradually according to the values 299.30, 306.12, 307.78, 305.34, 307.01, 308.34, 308.92 reaching to 350.03 Hz. The tonic segment takes a duration of 0.38 s and the minimum and maximum intensity registered are 78.41 dB and 88.86 dB respectively.

13.P.5 greeted a female colleague “// 5<sup>H</sup> hāla Ğu/māna// ‘Hello, Jumana’”.

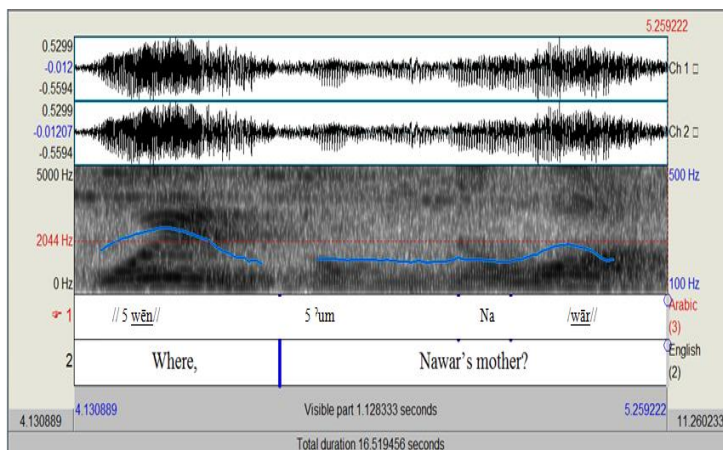


**Figure (20): Tone 3<sup>H</sup> by Edu.W 5**

The pretonic ends at 257.13 Hz and the tonic starts its slight fall from 255.15 Hz to 250.71 Hz where it starts its rising movement to reach 302.44 Hz. Tone 3<sup>H</sup> differs from -3<sup>H</sup> in that the latter starts its rise from the end point of the preceding foot or above, whereas the former starts lower than its preceding foot and takes a slight fall before commencing its rise. The tonic segment takes a duration of 0.32 s and the minimum and maximum intensity registered are 66.84 dB and 82.66 dB respectively.

14.P.2 asked her female colleague who said that the roof is dropping water after the rain “// 5 wēn// 5 ʔum (mm) Na/wār// ‘Where, Nawar’s mother?’”

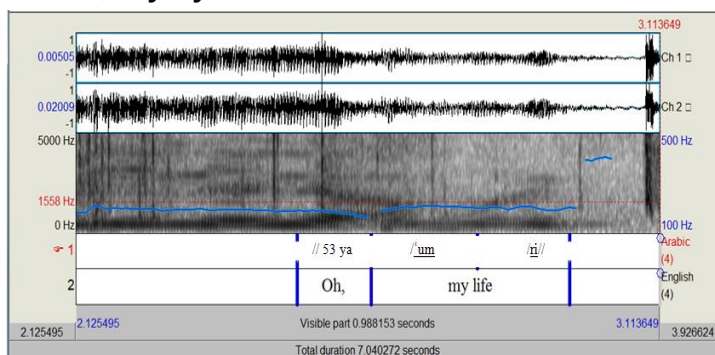
## Gender Variation Elicited in the Intonational Patterns of Address Terms in Everyday



**Figure (21): Tone 5 by Edu.W 2**

The speaker starts the tonic at 201.44 Hz and rises high to 252.73 Hz then falls to reach 204.91 Hz. The tonic segment takes a duration of 0.23s and the minimum and maximum intensity registered are 75.67 dB and 79.51 dB respectively.

15.P.4 replied to her daughter-in-law “// -3 hala:// 5 w /miyyat hala// 53 ya /um/ri// 5 hala /bīč // 53 ʔū/ni// ‘Oh! Hello and hundred hellos, my life. Welcome, my eyes’”.

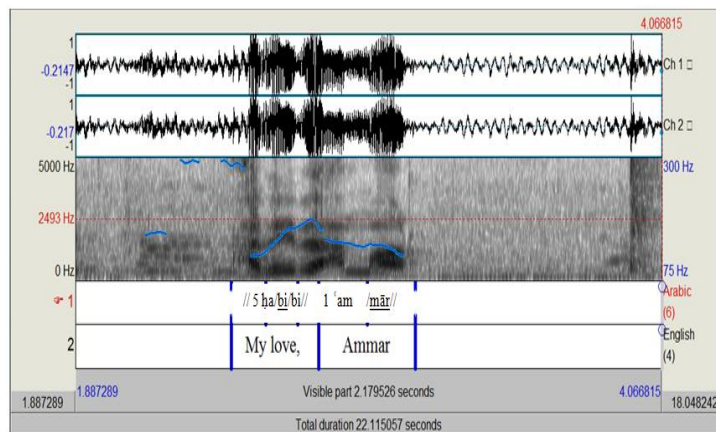


**Figure (22): Tone 53 by Edu.W 4**

The tonic of tone 5 starts at F0 190.82 Hz and rises to F0 210.43 Hz then falls to 200.10 Hz where the tonic of tone 3 starts. It first falls to 199.64 Hz then starts the slight rise to reach 202.98 Hz. The duration taken by the tonic segment is 0.32 s and the minimum and maximum intensity registered are 72.84 dB and 80.23 dB respectively.

Pedu.M use various types of address terms to add politeness to their utterances. These occur on tone 1, 3 (3, -3, 3<sup>H</sup>), 5 or -2+5:

16. On the phone, P.6 started “// 5 ḥa/bi/bi// 1 ‘am/mār// ‘My love, Ammar”.



**Figure (23): Tone 1 by Pedu.M 6**

Tonic F0 ranges from 141.29 Hz to 120.75 Hz. The tonic segment takes a duration of 0.16 s and the minimum and maximum intensity registered are 74.85 dB and 87.11 dB respectively.

17.P.3 replied to a friend “// 5 ha/law // 3 <sup>ʔ</sup>a/mī:r// ‘Hello, Ameer’”.

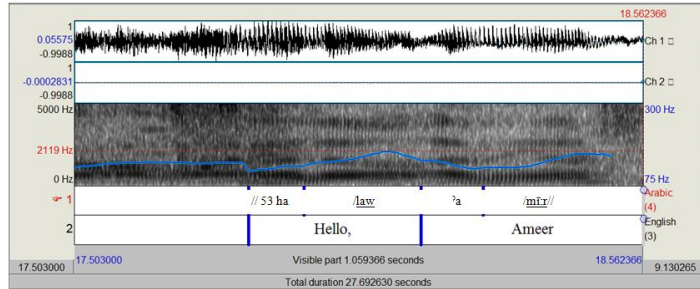
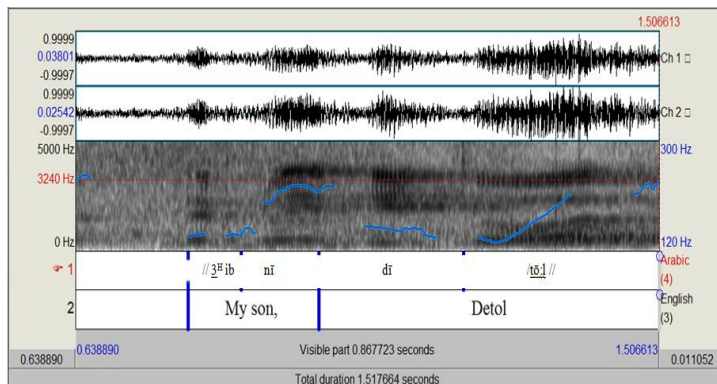


Figure (24): Tone 3 by Pedu.M 3

The pretonic ends at F0 123.59 Hz and the tonic starts at 122.39 Hz and rises to 161.17 Hz. The tonic segment takes a duration of 0.34 s and the minimum and maximum intensity registered are 69.82 dB and 79.30 dB respectively.

18.P.5 said, when he handed the recorder to the researcher “// -3 dik/tōrāh// 5 b-il/ ḥidma-ḥna// ‘Doctor, we are at your service’”.

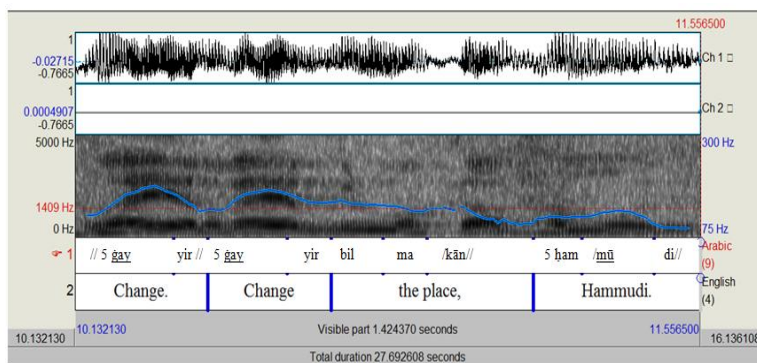
19. When a colleague told him that the floor is ruined because of the Flash (a type of cleaner), P.1 commented “// 3<sup>H</sup> ūf-il if-/flāš// 3<sup>H</sup> ibnī Dī/tō:l // ‘leave using the flash. My son, use Detol (3<sup>H</sup> stands for the high rising tone with a high rising pretonic). The use of a high rising tone on the address term reveals more concern and involvement.



**Figure (25): Tone 3<sup>H</sup> by Pedu.M 3**

The address term ranges from F0 144.95 Hz to 226.02 Hz, and the tonic ranges from F0 140.63 Hz to 233.01 Hz. The address term takes a duration of 0.25 s and the minimum and maximum intensity registered are 72.96 dB and 81.23 dB respectively.

20.P.3 addressed his friend on tone 5 in “// 5 gayyir // 5 gayyir bilma/kān// 5 ḥam/mūdi// ‘Change. Change the place, Hammudi’”.



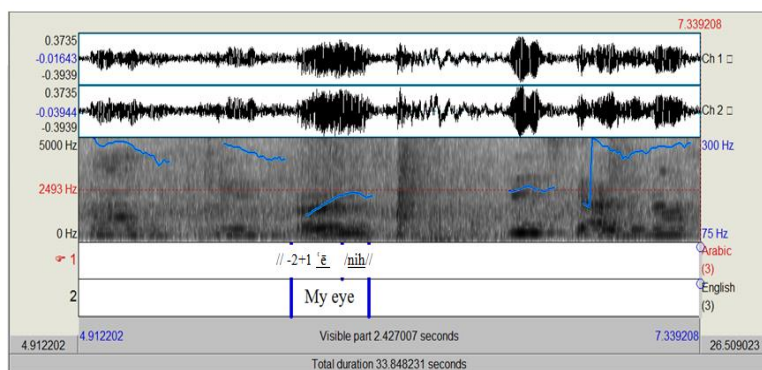
**Figure (26): Tone 5 by Pedu.M 3**



## Gender Variation Elicited in the Intonational Patterns of Address Terms in Everyday

Tonic F0 rises from 119.98 Hz to 133.36 Hz and falls to 94.58 Hz. The duration taken by the tonic segment (mūdi) is 0.27 s and the minimum and maximum intensity registered are 75.59 dB and 82.62 dB respectively.

21.P.8 replied to a female colleague calling his name “// - 2+1 ‘ē/nih’// ‘My eye’” as being prepared to hear what she is going to say.

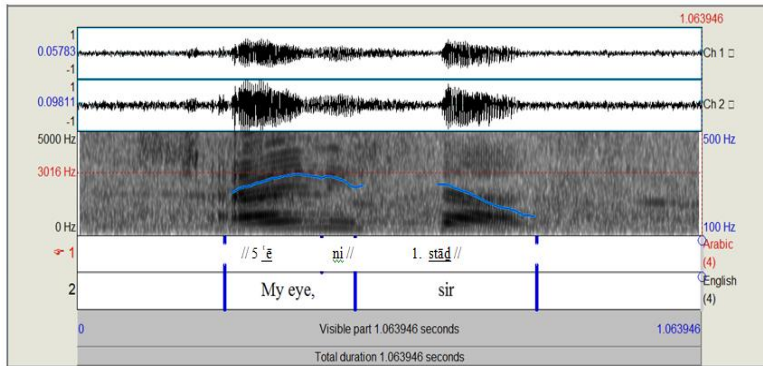


**Figure (27): Tone -2+5 by Pedu.M 8**

F0 of the first tonic, i.e. tone -2, ranges from 133.73 Hz to 181.95 Hz. So, it is clearly a high rising tone. The second tonic, i.e. tone 1, takes a slight fall from the end point of the preceding foot to 174.93 Hz. The duration taken by the address term is 0.27 s and the minimum and maximum intensity registered are 67.33 dB and 77.89 dB respectively.

Pedu.W, on the other hand, pronounce address terms on tone1 (1., 1+), 3 (3, -3), 5 (5, 5), 13 (1-3) or 53:

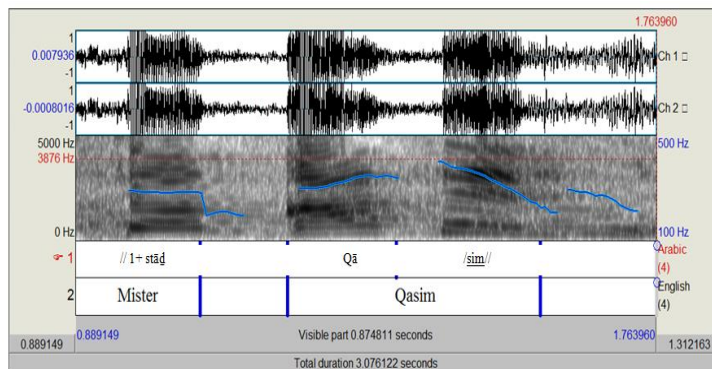
22.P.4 said “// 5 ‘ēni // 1. stād // ‘My eye, sir’” when giving him the rest of the money”.



**Figure (28): Tone 1 by Pedu.W 4**

F0 ranges from 298.17 Hz to 177.22 Hz. So, it is clearly a falling tone. The duration taken by the address term is 0.28 s and the minimum and maximum intensity registered are 66.13 dB and 84.37 dB respectively.

23.P.1 addressed her colleague “// 1+ stād Qā/sim// ‘Mister Qasim’”.



**Figure (29): Tone 1 by Pedu.W 4**

The pretonic ends at F0 338.85 Hz and the tonic ranges from 393.16 Hz to 208.66 Hz. It is a wide fall represented by 1+ where the tonic starts higher than the preceding foot. The duration taken by the address term is 0.25 s and the minimum and maximum intensity registered are 72.31 dB and 88.44 dB respectively.

24.P.7 thanked her male colleague for giving her a ruler  
 “//3 šuk/ran /sayyid// “Thank you, sayyid””.

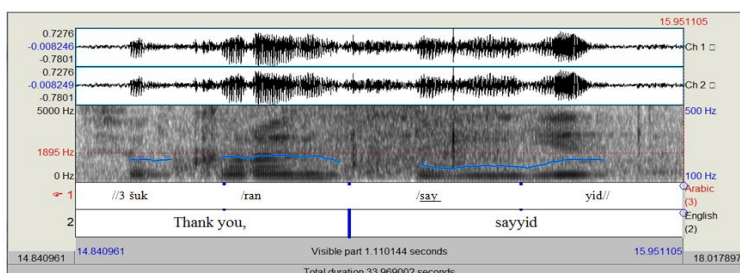
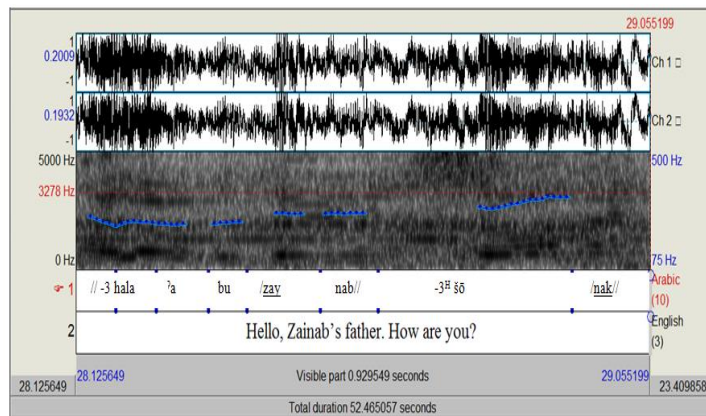


Figure (30): Tone 3 by Pedu.W 7

The tonic of tone 3 starts lower than the pitch level of the preceding foot and continues a low rising movement as the Figure (17) above illustrates. The starting F0 of the tonic reads 193.07 Hz. It takes a slight fall to 166.93 Hz, and then commences the low rise reaching to 217.22 Hz. The duration taken by the address term is 0.53 s and the minimum and maximum intensity registered are 62.24 dB and 83.82 dB respectively.

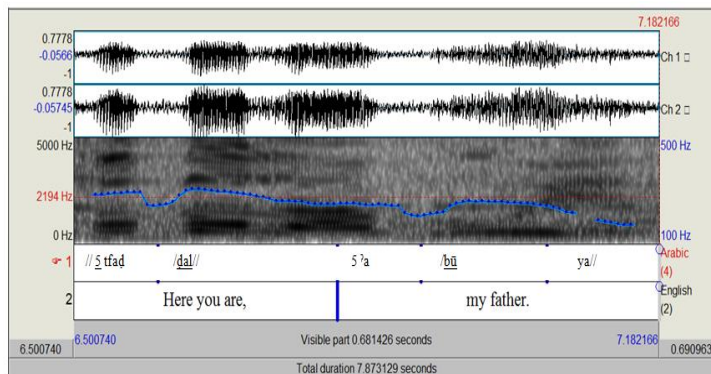
25.P.6 replied to a male colleague, “// -3<sup>H</sup> ‘a/ laykum issa/lā:m// -3 hala ‘abu /zaynab// -3 šō/nak// 3<sup>H</sup> (‘a)ḥ/bāra::k// ‘peace be upon you. Hello, Zainab’s father. How are you? What is new?”



**Figure (31): Tone -3 by Pedu.W 4**

The tonic takes a level movement with a slight rise at the end; F0 ranges from 276.41 Hz to 277.23 Hz. The duration taken by the tonic segment (zaynab) is 0.31 s and the minimum and maximum intensity registered are 81.36 dB and 90.01 dB respectively.

26. While giving a customer the things he bought, P.4 said “// 5 tfad/dal// 5 ʔa/būya// ‘Here you are, my father’”.

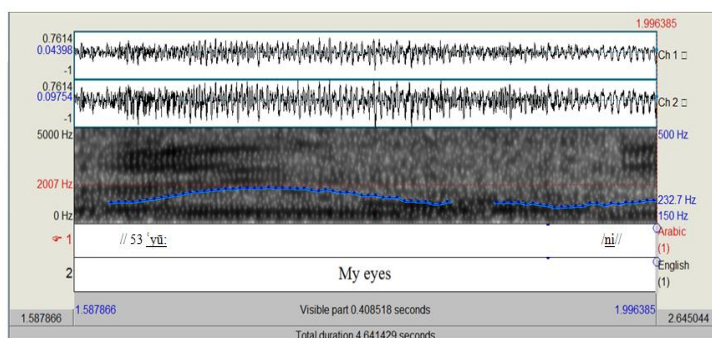


**Figure (32): Tone 5 by Pedu.W 4**

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F0 of the tonic syllable starts at 212.12 Hz and rises to reach 259.17 Hz then descends to 215.14 Hz. The syllable following the tonic continues the fall reaching to 169.96 Hz. The duration taken by the tonic segment (būya) is 0.27 s and the minimum and maximum intensity registered are 71.09 dB and 84.32 dB respectively.

27.P.4 offered readiness to assist her female friend before leaving “// 53 yū:/ni// 5 šinu tardīn// ‘My eyes, whatever you need (I am at your service)?’” The speaker lengthened the vowel in the first syllable that takes tone 5 and pronounces the second syllable on tone 3.

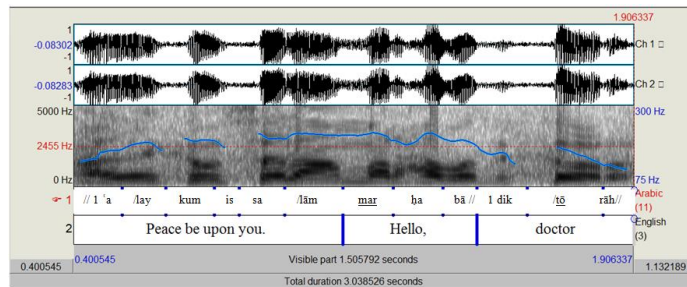


**Figure (33): Tone 53 by Pedu.W 4**

The tonic of tone 5 starts at F0 225.96 Hz and rises to 279.53 Hz where it starts to descend to 220.35 Hz. Tonic 3, on the other hand, descends to 206.47 Hz where it starts rising to reach 228.99 Hz. The address term takes a duration of 0.39 s and the minimum and maximum intensity registered are 76.42 dB and 83.44 dB respectively.

Unedu.M also use various types of address terms to address relatives, friends, colleagues and strangers. These are pronounced on tone 1 or 5:

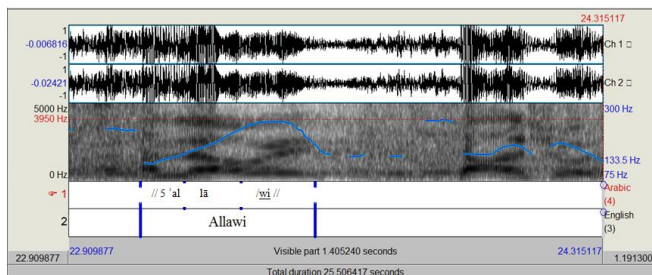
28.P7 replied to a female greeting “// 1 ‘a/laykum issa/lām /marḥabā // 1 dik/tōrāh// ‘Peace be upon you. Hello, doctor’”.



**Figure (34): Tone 1 by Unedu.M 7**

Tonic F0 ranges from 185.84 Hz to 135.801786 Hz and the syllable following the tonic continues the fall to 122.97 Hz. The duration taken by the tonic segment (tōrāh) is 0.29 s and the minimum and maximum intensity registered are 68.05 dB and 89.28 dB respectively.

29.P.3 called at his colleague “// 5 ‘allā/wi // ‘Allawi’”.

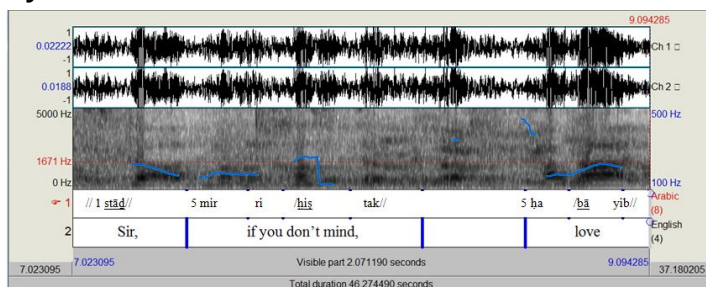


**Figure (35): Tone 5 by Unedu.M 3**

Tonic F0 rises from 235.18 Hz to 246.06 Hz and then descends to 178.32 Hz. The duration taken by the tonic is 0.19 s and the minimum and maximum intensity registered are 76.92 dB and 85.67 dB respectively.

In their daily interaction, Unedu.W use various types of polite address terms. These occur on tone 1, 3 (3, -3<sup>H</sup>, 3<sup>H</sup>), 5 or 53:

30. Before saying a request, P.2 started “// 1 stād// 5 mir (min) ri/histak// 5 ḥa/bāyib// ‘Sir, if you don’t mind, lovely’”.

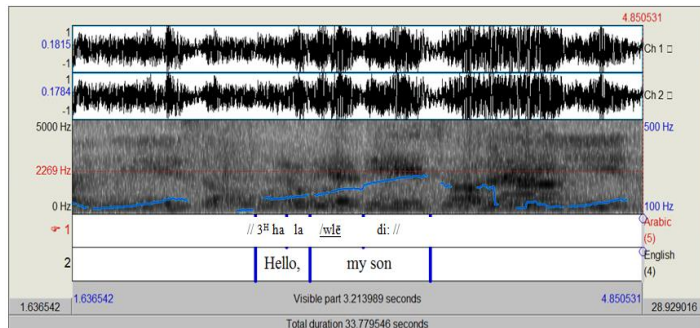


**Figure (36): Tone 1 by Unedu.W 2**

The address term (stād) is said on a falling tone with F0 descending from 223.74 Hz to 168.24 Hz. The address term takes a duration of 0.30 s and the minimum and maximum intensity registered are 79.45 dB and 90.37 dB respectively.

31. P.6 invited her relative to enter her son’s room which is prepared for his wedding “// 5 tfaddli // 5 tfaddli // 3 ḥāla// ‘Come in. Come in, auntie’”.

32. P.8 replied to a male official greeting her after Eid Al-Fitir “// 3<sup>H</sup> hala /wlēdi::// ‘Hello, my son’”



**Figure (37): Tone 3<sup>H</sup> by Unedu.W 8**

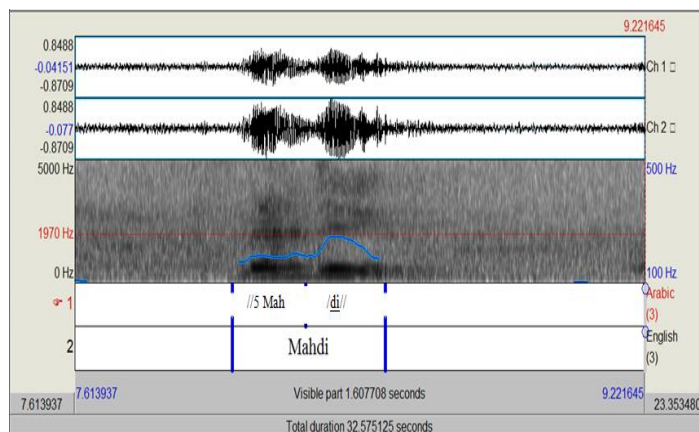
The pretonic ends at F0 171.70 Hz and tonic F0 starts at 174.18 Hz and takes a slight fall to 173.32 where it commences its rising movement to 181.64 Hz. The syllable following the tonic continues the rise to reach 260.48 Hz. Thus, it is a high rising tone. The address term takes a duration of 0.74 s and the minimum and maximum intensity registered are 77.50 dB and 89.15 dB respectively.

33.P.8 replied to the greeting and Eid congratulations of the researcher by saying “// -3<sup>H</sup> hala /bnayti // -3<sup>H</sup> ḥa/bībti: // -3<sup>H</sup> hala/ bīč// 1 ba‘ad gal/bi// ‘Hello, my daughter, my love. You’re welcome. Long you live’”. Tone -3<sup>H</sup> is a gradually rising tone. It starts from the end point of the preceding foot or higher, unlike tone 3 which starts lower. It was difficult to get a clear spectrogram of the tone because of mixed talk.

34.Before offering her colleague an advice, P.4 addressed him “//5 Mah/di// ‘Mahdi’”.



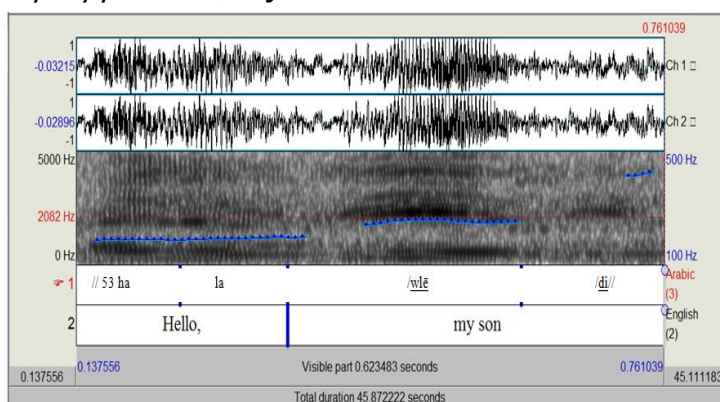
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**Figure (38): Tone 5 by Unedu.W 4**

The tonic is pronounced on a rising falling tone; it starts at F0 208.02 Hz and rises to 249.97 Hz then falls to 173.78 Hz. The duration is 0.17 s and the minimum and maximum intensity registered are 74.96 dB and 84.84 dB respectively.

35.P.8 replied to a male official greeting her “// 53 hala /wlē/di// ‘Hello, my son’”.



**Figure (39): Tone 53 by Unedu.W 8**

The first syllable of the address term takes a rising falling movement followed by a low rising movement on the second syllable. The first tonic starts at F0 239.78 Hz and ascends to 258.52 Hz, then falls to 249.58 Hz. The second tonic, i.e. tonic 3, starts at 249.03Hz and rises to 425.74 Hz. The duration is 0.44 s and the minimum and maximum intensity registered are 75.88 dB and 89.02 dB respectively.

### **5. 1 Analysis of the Results**

After examining the performance of the participants, a calculation was carried out to examine the participants' performance regarding the way address terms were pronounced. The percentages of tone types by each gender of the three educational groups and by each gender as a whole were calculated. The tones were divided into two groups: falling tones, i.e. those that end with a falling movement; and, rising tones, i.e. those that end with a rising movement. The table below presents the tones produced by each gender group.

**Table (1): Tone used by each gender group**

Participants/ Tones	Falling Tones				Rising Tones						
	1	1+	5	- 2+ 1	3	-3	- 3 <sup>H</sup>	3 <sup>H</sup>	<u>3</u> <sup>H</sup>	53	<u>53</u>
<b>Edu.M</b>	6	1	17	0	2	1	1	0	0	0	1
<b>Edu.W</b>	6	1	18	0	3	1	2	2	0	1	0
<b>Pedu.M</b>	10	0	17	1	2	1	0	0	1	0	0
<b>Pedu.W</b>	5	1	19	0	3	1	0	0	0	2	0
<b>Unedu.M</b>	3	0	22	0	0	0	0	0	0	0	0
<b>Unedu.W</b>	7	0	20	0	1	0	2	2	0	4	0
<b>Total</b>	37	3	11	1	11	4	5	4	1	7	1
<b>Percentages</b>	20	2	60	1	6	2	3	2	1	4	1

The most frequently uttered tone is tone 5, the rising-falling tone. The table shows that 60% of address terms were pronounced on tone 5. This tone adds more passion and involvement on the utterance. It is more powerful than tone 1 on which 20% of address terms were pronounced. The latter is neutral. The secondary variants of tone 3, i.e. tone 3, -3, -3<sup>H</sup> and 3<sup>H</sup>, are mostly pronounced by women. And, tone 53 occurs only by women.

The performance of men and women in each educational group is turned into numbers and percentages to decide gender variation in the pronunciation of address terms as table (2) below illustrates.

Table (2) Percentages of educated participants' performance

Participants/Tone	Educated Participants				
	Total	Men	%	Women	%
Falling	49	24	49%	25	51%
Rising	14	5	36%	9	64%

The table shows that rising tones are used more by women than by men; 64 % of address terms said by educated participants on rising tones are those uttered by women whereas only 36 % of them are produced by men. In relation to address terms pronounced on falling tones, men and women show approximate achievements, 49% and 51% respectively. In relation to partly educated participants, table (3) reveals the results.

Table (3) Percentages of partly educated participants' performance

Participants/Tones	Partly educated Participants				
	Total	Men	%	Women	%
Falling	53	28	53%	25	47%
Rising	10	4	40%	6	60%

Partly educated men and women differ in the use of rising tones but show approximate performance in the use of falling tones. The table shows that 60% of address

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terms uttered on rising tones are pronounced by women, whereas only 40% of them were uttered by men. The situation is not very different in the case of uneducated participants as table (4) below illustrates.

Table (4) Percentages of uneducated participants' performance

Participants/Tones	Uneducated Participants				
	Total	Men	%	Women	%
<b>Falling</b>	<b>52</b>	<b>25</b>	<b>48%</b>	<b>27</b>	<b>52%</b>
<b>Rising</b>	<b>9</b>	<b>0</b>	<b>0%</b>	<b>6</b>	<b>100%</b>

Uneducated men and women approximate each other in pronouncing address terms on falling tones but differ in the use of rising tones. All nine occurrences produced on rising tones are uttered by women. The total performance of the three educational groups is illustrated in table (5) below.

Table (5) Percentages of total participants' performance

Participants/Tones	Participants				
	Total	Men	%	Women	%
<b>Falling</b>	<b>154</b>	<b>77</b>	<b>50%</b>	<b>77</b>	<b>50%</b>
<b>Rising</b>	<b>33</b>	<b>9</b>	<b>27%</b>	<b>24</b>	<b>73%</b>

The table shows equal values in the use of falling tones and variation in the use of rising tones.

The results were statistically analysed using Mann-Whitney test. No significant differences occur between men and women in the three educational groups in relation to falling tones. As for rising tones, significant differences appear in the performance of uneducated women and the total performance of women as a whole in contrast to uneducated men and men as a whole respectively, as indicated in tables (6) and (7) below.

Table (6): Uneducated participants' performance in the use of rising tones

Gender	N	Mean Rank	Sum of Ranks	P value	significance
Men	8	6.50	52.00	0.027	sig.
Women	8	10.50	84.00		

With reference to a Mann-Whitney U test, uneducated women differ from uneducated men in the use of rising tones (the mean ranks of men and women were 6.50 and 10.50 respectively,  $p = 0.027$ ;  $p < 0.05$ ).

Table (7): Total participants' Performance in the use of rising tones

Gender	N	Mean Rank	Sum of Ranks	P value	significance
Men	24	20.06	481.50	0.015	Sig.
Women	24	28.94	694.50		

According to a Mann-Whitney U test women differ from men in the use of rising tones (the mean ranks of men and women were 20.06 and 28.94 respectively,  $p = 0.015$ ;  $p < 0.05$ ).

## **5.2 Acoustic Analysis of the Results**

The acoustic analysis of data indicates that the pitch range of women is higher than that of men. When pronouncing monosyllabic tokens, i.e. address terms with the tone movement on one syllable, women's pitch range is higher than that of men especially when pronouncing rising tones. Tone 3 occurred with a pitch range of 94.73 Hz by Edu.W in contrast to 40.14 Hz by Pedu.M. It also received a higher intensity by Edu.W (10.55 dB) in contrast to 9.48 dB by Pedu.M. As for duration, it took 0.40 s by Edu.W and 0.34 s by Pedu.M.

The case in relation to bisyllabic tokens (address terms where the tonic movement extends on two syllables), is not very different. Edu.M show high pitch ranges when pronouncing falling tones in contrast to women who favour high pitch ranges on rising tones. There are some exceptions: tone 53 by Edu.M2, since it is a compound tone and emphatic tone 3 (3<sup>H</sup> and -3<sup>H</sup>). Pedu.W and Unedu.W show equal high pitch ranges on falling tones and rising tones.

In relation to intensity, men pronounce bisyllabic tokens on higher intensity than women. Duration, on the

other hand, show variation in performance. Edu.M show higher duration in pronouncing rising tones than women. Pedu.M, on the other hand, show approximate duration in pronouncing rising tones and falling tones in contrast to Pedu.W who prefers higher duration on rising tones. As for uneducated participants, Unedu.W exceed Unedu.M in duration as indicated in the appendix.

Mann-Whitney test is used to examine if the above variations are significant. A significant difference appears in the performance of women in relation to bisyllabic tokens and the use of high pitch range. In general, the pitch range of women is higher than the pitch range of men, as table (8) below indicates.

Table (8): Total Participants' Achievements in Relation to Pitch Range

Gender	N	Mean Rank	Sum of Ranks	P value	significance
Men	16	12.38	198.00	0.038	Sig.
Women	14	19.07	267.00		



According to a Mann-Whitney U test women use higher pitch range in pronouncing bisyllabic tokens (the mean ranks of men and women were 12.38 and 19.07 respectively,  $p = 0.038$ ;  $p < 0.05$ ).

### **6.3 Discussion**

In general, men and women produce address terms on falling tones on equal rates; 50% for each gender, but vary in the use of rising tones; 73% of address terms produced on rising tones are those pronounced by women, whereas only 27% of rising tone address terms are pronounced by men. Educational background affects this tendency and widens the difference in pronunciation since significant differences are registered in the use of rising tones for women in general and uneducated women in particular.

Women exceed men in the minimum, maximum and pitch range registered of monosyllabic and bisyllabic tokens. In relation to monosyllabic tokens pronounced on tone 1, the minimum pitch registered for men is 111.91 Hz by Pedu.M in contrast to 168.24 Hz by Unedu.W, the maximum pitch registered is 176.70 Hz by Pedu.M in contrast to 341.52 Hz by Pedu.W, and the maximum pitch range recorded for men is 28.36 Hz by Pedu.M in contrast 96.88 Hz by Pedu.W. In relation to intensity, the

minimum intensity recorded for men (74.85 dB by Pedu.M) is higher than that for women (60.82 by Edu.W), but the maximum intensity and intensity range recorded for women are higher than those for men, 90.37 dB by Unedu.W and 18.24 dB by Pedu.W in contrast to 87.11 dB by Pedu.M and 12.26 dB by Pedu.M respectively.

The minimum pitches recorded for bisyllabic tokens produced on tone 1 are 83.76 Hz by Edu.M in contrast to 96.70 Hz by Edu.W, and the maximum pitches are 182.56 Hz by Unedu.M to 233.07 Hz by Edu.W, and the maximum pitch ranges are 59.67 Hz by Unedu.M and 58.49 Hz by Pedu.W. The values reveal that women pronounce address terms on higher minimum and maximum pitch than men. They also approximate or exceed men in pitch ranges.

Women produce rising tones on higher minimum, maximum and pitch ranges than men. The minimum pitch registered for tone 3<sup>H</sup> is 142.78 Hz by Pedu.M in contrast to 173.51 Hz by Unedu.W, the maximum pitch recorded is 227.16 Hz by Pedu.M to 304.57 Hz by Edu.W, and the highest pitch range recorded for ton 3<sup>H</sup> is 84.38 Hz by Pedu.M to 86.61 Hz by Unedu.W. The wide pitch range and the use of rising tones that characterise women's speech indicate emotional involvement and friendliness. They reflect women's gender identity.

## 7. Conclusions

The profound analysis of participants' achievements leads to the following conclusions:

1. Gender variations are higher in the use of rising tones than in the use of falling tones; falling tones are used on approximately equal rates by men and women, whereas rising tones are used more by women than by men.
2. Educational background affects pronunciation and widens the differences between men and women.
3. The minimum F0 values registered for men are lower than those for women; 83.76 Hz, 93.80 Hz and 122.89 Hz by Edu.M, Pedu.M and Unedu.M respectively in contrast to 191.25 Hz, 128.94 Hz and 136.98 Hz by Edu.W, Pedu.W and Unedu.W respectively.
4. With the exception of educated participants, the maximum F0 registered for Pedu.W (279.59 Hz) and Unedu.W (295.11 Hz) are higher than those registered for Pedu.M (227.16 Hz) and Unedu.M (255.50 Hz).
5. The same applies to pitch ranges where Pedu.W and Unedu.W recorded higher pitch ranges than Pedu.M and Unedu.M; 140.97 Hz and 86.61 Hz in contrast to 84.38 Hz and 59.67 Hz respectively.
6. The use of higher pitch ranges added to the use of rising tones by women, indicates gender-related aspects of speech which form women's social identity.
7. Iraqi Arabic requires a modification of Halliday's intonational system to meet the needs of proper description of its intonation. Thus, tones -3<sup>H</sup>, 3<sup>H</sup> and 3<sup>H</sup> have been added.
8. Iraqi Arabic, unlike English, shows the use of compound tones on a single word, or even a single syllable. It is a language that celebrates tone variation.

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## Appendix

Table (1): Detailed Statistics of Pitch Range, Intensity Range and Duration of Monosyllabic Tokens on tone 1

Partici pant	Pitch (Hz)		Ran ge (Hz)	Intensity (dB)		Ran ge	Durat ion (s)
	Minim	Maxim		Minim	Maxim		
Edu.W	267.36	284.62	17.2	60.82	77.15	16.3	0.15
Edu.W	278.90	306.85	27.9	73.63	80.41	6.78	0.14
Pedu.M	156.07	176.70	20.6	82.74	83.97	1.23	0.11
Pedu.M	111.91	140.27	28.3	74.85	87.11	12.2	0.16
Pedu.W	184.86	219	34.1	64.24	78.71	14.4	0.13
Pedu.W	324.30	341.52	17.2	78.83	89.61	10.7	0.48
Pedu.W	200.47	297.35	96.8	66.13	84.37	18.2	0.28
Unedu.	168.24	223.74	55.5	79.45	90.37	10.9	0.30

Table (2): Detailed Statistics of Pitch Range, Intensity Range and Duration of Bisyllabic Tokens on tone 1

Partici pant	Pitch (Hz)		Ran ge (Hz)	Intensity(dB)		Range( dB)	Durat ion (s)
	Mini mum	Maxi mum		Mini mum	Maxi mum		
Edu.M	132.28	162.03	29.7	61.59	85.44	23.85	0.29
Edu.M	134.52	148.67	14.1	71.72	86.20	14.48	0.14
Edu.M	83.76	108.02	24.2	67.62	76.14	8.52	0.24
Edu.M	91.43	134.75	43.3	66.52	83.90	17.38	0.30
Edu.W	211.18	233.07	21.8	58.42	63.38	4.96	0.25
Edu.W	96.70	134.32	37.6	61.70	71.53	9.83	0.16
Pedu.	99.10	105.77	6.67	69.01	82.38	13.37	0.28

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<b>Pedu.</b>	<b>106.58</b>	<b>139.69</b>	<b>33.1</b>	<b>77.05</b>	<b>83.45</b>	<b>6.4</b>	<b>0.20</b>
<b>Pedu.</b>	<b>147.46</b>	<b>205.95</b>	<b>58.4</b>	<b>69.45</b>	<b>84.66</b>	<b>15.21</b>	<b>0.28</b>
<b>Unedu.</b>	<b>132.24</b>	<b>170.33</b>	<b>38.1</b>	<b>76.28</b>	<b>89.50</b>	<b>13.22</b>	<b>0.16</b>
<b>Unedu.</b>	<b>122.89</b>	<b>182.56</b>	<b>59.6</b>	<b>68.05</b>	<b>89.28</b>	<b>21.23</b>	<b>0.29</b>
<b>Unedu.</b>	<b>186.52</b>	<b>232.98</b>	<b>46.4</b>	<b>76.10</b>	<b>84.63</b>	<b>8.53</b>	<b>0.29</b>
<b>Unedu.</b>	<b>168.24</b>	<b>223.74</b>	<b>55.5</b>	<b>79.45</b>	<b>90.37</b>	<b>10.92</b>	<b>0.30</b>

Table (3): Detailed Statistics of Pitch Range, Intensity Range and Duration of Monosyllabic Tokens on tone 1+

Participan	Pitch (Hz)		Range (Hz)	Intensity(dB)		Range (dB)	Duration(s)
	Minimum	Maximum		Minimum	Maximum		
<b>Edu.W</b>	<b>347.0</b>	<b>358.34</b>	<b>11.</b>	<b>54.45</b>	<b>59.36</b>	<b>4.91</b>	<b>0.04</b>
<b>Pedu.</b>	<b>225.6</b>	<b>396.41</b>	<b>170</b>	<b>72.31</b>	<b>88.44</b>	<b>16.13</b>	<b>0.25</b>

Table (4): Detailed Statistics of Pitch Range, Intensity Range and Duration of Bisyllabic Tokens on tone 1+

Participan	Pitch(Hz)		Range (Hz)	Intensity(dB)		Range (dB)	Duration(s)
	Minimum	Maximum		Minimum	Maximum		
<b>Edu.M</b> <b>6</b>	<b>386.0</b> <b>5</b>	<b>423.27</b>	<b>37.</b> <b>22</b>	<b>85.17</b>	<b>87.30</b>	<b>2.13</b>	<b>0.300</b>

Table (5): Detailed Statistics of Pitch Range, Intensity Range and Duration of Monosyllabic Tokens on tone 3

Participant	Pitch(Hz)		Range (Hz)	Intensity(dB)		Range(dB)	Duration
	Minimum	Maximum		Minimum	Maximum		
Edu.W	100.62	195.35	94.7	64.08	74.63	10.55	0.40
Pedu.	122.50	162.64	40.1	69.82	79.30	9.48	0.34

Table (6): Detailed Statistics of Pitch Range, Intensity Range and Duration of Bisyllabic Tokens with tone 3

Participant	Pitch(Hz)		Range (Hz)	Intensity (dB)		Range (dB)	Duration(s)
	Minimum	Maximum		Minimum	Maximum		
Edu.M	130.29	164.34	34.0	68.85	83.14	14.29	0.51
Edu.M	89.72	110.69	20.9	69.62	85.59	15.97	0.34
Pedu.	133.49	141.21	7.72	62.78	67.94	5.16	0.27
Pedu.	205.30	237.27	31.9	82.51	88.70	6.19	0.18
Pedu.	171.90	219.40	47.5	62.24	83.82	21.58	0.53

Table (7): Detailed Statistics of Pitch Range, Intensity Range and Duration of Monosyllabic Tokens on tone 3<sup>H</sup>

Participant	Pitch(Hz)		Range	Intensity(dB)		Range (dB)	Duration(s)
	Mini	Maxi		Mini	Maxi		
Unedu.	188.11	299.01	110.	70.23	86.39	16.16	0.34



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Table (8): Detailed Statistics of Pitch Range, Intensity Range and Duration of Bisyllabic Tokens on tone 3<sup>H</sup>

Participan	Pitch(Hz)		Range	Intensity(dB)		Range (dB)	Duration(s)
	Mini	Maxi		Mini	Maxi		
Edu.W	243.70	271.48	27.7	61.55	67.64	6.09	0.28
Edu.W	253.07	304.57	51.5	66.84	82.66	15.82	0.32
Pedu.	142.78	227.16	84.3	72.96	81.23	8.27	0.25
Unedu.	173.51	260.12	86.6	77.50	89.15	11.65	0.74

Table (9): Detailed Statistics of Pitch Range, Intensity Range and Duration of Bisyllabic Tokens on tone -3

Participan	Pitch(Hz)		Range	Intensity(dB)		Range (dB)	Duration (s)
	Minim	Maxi		Minim	Maxi		
Edu.M	99.40	122.08	22.6	70.23	82.58	12.35	0.53
Pedu.	274.71	278.74	4.03	81.36	90.01	8.65	0.31

Table (10): Detailed Statistics of Pitch Range, Intensity Range and Duration of Monosyllabic Tokens on tone -3<sup>H</sup>

Participan	Pitch(Hz)		Range (Hz)	Intensity(dB)		Range (dB)	Duration(s)
	Minim	Maxim		Minim	Maxi		
Edu.M	193.30	217.91	24.6	79.12	88.30	9.18	0.18

Table (11): Detailed Statistics of Pitch Range, Intensity Range and Duration of Bisyllabic Tokens on tone -3<sup>H</sup>

Participan	Pitch(Hz)		Range	Intensity(dB)		Range (dB)	Duration (s)
	Minim	Maxim		Minim	Maxim		
Edu.W	304.80	362.34	57.	78.41	88.86	10.45	0.38
Edu.W	285.83	318.34	32.	76.06	88.92	12.86	0.29

Table (12): Detailed Statistics of Pitch Range, Intensity Range and Duration of Monosyllabic Tokens on tone 5

Participant	Pitch (Hz)		Range (Hz)	Intensity (dB)		Range (dB)	Duration (s)
	Minimum	Maximum		Minimum	Maximum		
Edu.M8	137.99	176.33	38.3	74.25	86.49	12.2	0.37
Edu.W2	201.04	252.73	51.6	75.67	79.51	3.84	0.23
Edu.W3	239.41	258.43	19.0	69.85	81.97	12.1	0.22
Edu.W5	244.68	256.77	12.0	67.06	79.95	12.8	0.23
Edu.W6	247.67	269.47	21.8	62.42	66.86	4.44	0.17
Pedu.M1	166.57	179.83	13.2	78.24	85.08	6.84	0.12
Pedu.M4	157.44	165.03	7.59	65.44	71.68	6.24	0.15
Pedu.M5	202.43	206.91	4.48	80.73	88.90	8.17	0.23
Pedu.W5	211.92	231.42	19.5	74.98	84.37	9.39	0.24
Pedu.W6	268.19	296.42	28.2	79.42	89.52	10.1	0.17
Unedu.M	166.75	189.54	22.7	71.82	84.10	12.2	0.12
Unedu.M	197.48	246.56	49.0	76.92	85.67	8.75	0.19
Unedu.M	201.11	247.05	45.9	75.69	89.23	13.5	0.18
Unedu.M	212.44	248.11	35.6	75.85	89.90	14.0	0.26
Unedu.M	211.86	256.68	44.8	74.18	88.06	13.8	0.19
Unedu.W	210.41	249.69	39.2	74.96	84.84	9.88	0.17
Unedu.W	188.22	254.68	66.4	77.17	87.07	9.9	0.20

F\* = Falsetto

**Gender Variation Elicited in the Intonational Patterns of Address Terms in Everyday**

Table (13): Detailed Statistics of Pitch Range, Intensity Range and Duration of Bisyllabic Tokens on tone 5

Participant	Pitch (Hz)		Range (Hz)	Intensity (dB)		Range (dB)	Duration (s)
	Minimum	Maximum		Minimum	Maximum		
Edu.M1	195.40	207.0	11.69	68.9	74.34	5.4	0.1
Edu.M2	89.05	110.4	21.44	60.6	63.91	3.28	0.2
Edu.M3	196.74	228.8	32.09	73.8	91.22	17.4	0.3
Edu.M5	105.65	118.7	13.12	76.2	81.51	5.28	0.2
Edu.M6	144.25	173.8	29.55	71.4	82.13	10.7	0.2
Edu.M7	84.95	147.8	62.9	77.2	84.51	7.26	0.2
Edu.W1	193.91	210.3	16.42	59.2	69.74	10.5	0.3
Pedu.M3	93.80	133.3	39.52	75.5	82.62	7.03	0.2
Pedu.M6	128.38	152.3	24	76.9	89.17	12.2	0.2
Pedu.W	239.03	279.5	40.56	82.1	88.97	6.87	0.1
Pedu.W	202.00	264.1	62.15	74.4	82.86	8.39	0.2
Pedu.W	170.49	259.0	88.56	71.0	84.32	13.2	0.2
Pedu.W	144.44	204.9	60.54	65.8	84.82	18.9	0.3
Unedu.	174.73	216.5	41.81	78.1	87.56	9.46	0.2
Unedu.	203.48	255.5	52.02	76.2	90.98	14.7	0.3
Unedu.	136.98	192.4	55.51	66.7	85.72	19.0	0.3
Unedu.	197.66	234.2	36.62	74.8	89.97	15.1	0.2
Unedu.	234.54	299.8	65.29	75.9	82.76	6.85	0.2
Unedu.	181.17	261.6	80.45	75.3	87.38	12.0	0.4

Table (14): Detailed Statistics of Pitch Range, Intensity Range and Duration of Bisyllabic Tokens on tone 53

Participant	Pitch(Hz)		Range (Hz)	Intensity		Range	Duration
	Minimum	Maximum		Minimum	Maximum		
Edu.W	191.25	209.92	18.6	72.84	80.23	7.39	0.32
Pedu.W	162.24	228.72	66.4	76.76	86.96	10.2	0.39
Pedu.W	128.94	269.91	140.	76.42	83.44	7.02	0.39
Unedu.	213.91	295.11	81.2	79.48	89.43	9.95	0.46
Unedu.	210.94	258.35	47.4	75.88	89.02	13.1	0.44

Table (15): Detailed Statistics of Pitch Range, Intensity Range and Duration of Bisyllabic Tokens on tone 53

Participant	Pitch(Hz)		Range	Intensity		Range	Duration
	Minimum	Maximum		Minimum	Maximum		
Edu.M	102.11	169.45	67.3	60.87	79.13	18.2	0.41

Table (16): Detailed Statistics of Pitch Range, Intensity Range and Duration of Bisyllabic Tokens on tone -2+1

Participant	Pitch(Hz)		Range (Hz)	Intensity (dB)		Range (dB)	Duration (s)
	Minimum	Maximum		Minimum	Maximum		
Pedu.M8	133.70	181.91	48.21	67.33	77.89	10.56	0.27