

Intonations of Two Kuwaiti Dialects

Rahima S. Akbar*, Hanan A. Taqi

The Public Authority for Applied Education & Training (PAAET), College of Basic Education (CBE), The English Department (TED), Ardiya, Kuwait

Email: *rahima.s.akbar@gmail.com

How to cite this paper: Akbar, R. S., & Taqi, H. A. (2021). Intonations of Two Kuwaiti Dialects. *Open Journal of Modern Linguistics*, 11, 291-305.

<https://doi.org/10.4236/ojml.2021.113023>

Received: April 13, 2021

Accepted: May 14, 2021

Published: May 17, 2021

Copyright © 2021 by author(s) and Scientific Research Publishing Inc. This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

Abstract

Evidence of differences in intonation patterns among Arabic dialects is arising, along with known values of variation in supra-segmental typology. This study is a phonological and acoustic attempt to investigate the hypothesis of the occurrence of variation in the intonation of two Kuwaiti dialects—more specifically in the pitch of these two dialects, namely, the modern Kuwaiti dialect of Arabic and Kuwaiti Bedouin Arabic. The study investigates the effect of gender as well on the pitch levels. The study depends on spontaneous data collected through a series of recordings to identify the existence of intonation differences. The results of the study show that the pitch is generally higher in Kuwaiti Bedouin Arabic. In addition, the researchers found segmental differences, evident in vowels, more than consonants. The results could aid linguists in understanding differences in dialectal Arabic speech.

Keywords

Sociolinguistics, Phonetics, Intonation, Kuwait, Arabic, Languages, Gender

1. Introduction

Through speech, people communicate by choosing certain words, putting them in a certain order and adding intonation. That is to say, the pauses we make, the choice of prominent words, and the pitch contour we add to these words all add meaning to an utterance. Therefore, intonation is not a decorative additive; rather, it is the main part of any speech. One of the first attempts to identify the characteristics of intonation was made by De Lattre (1963) who describes intonation as being the “salt of an utterance”. He adds that without intonation, speech is “tasteless and colorless” (p. 179).

Later, Halliday (1970) linked intonation to the information structure. He stated that the expression of information structure is done through intonation

(p. 162). Halliday also believed that intonation and grammar are interrelated, and intonation contrasts are grammatical. Crystal (1966) before Halliday added that intonational segmentation corresponds to elements of clause structure, not to the clause as a whole. In 1969, Crystal added more to intonation; he stated that intonation refers to “a phenomenon which has a very clear center of pitch contrasts” (p. 196). Intonation consists of loudness, duration and pause. Pitch, the major component of intonation, is identified by direction and complexity. By direction we mean high and low, whereas, by complexity we mean rise, fall or a combination of both. The method of identifying pitch contour, and pitch range can be simply done through phonetic programs such as PRAAT.

The following paper is concerned with two types of intonation systems. These systems are based on two Kuwaiti dialects. The first dialect is the modern Kuwaiti dialect of Arabic (KDA hereafter), and the second type is the Kuwaiti Bedouin Arabic (KBA hereafter). These two dialects are used among the native inhabitants of Kuwait. KDA is the dominant dialect. It is spoken among city people who are more modernized and generally wealthier. KDA is used in the media (as in talk shows). KBA is spoken in communities where people come from tribal backgrounds; they mostly live in the suburbs. Nowadays second and third generations of KBA speakers live in the city. Their original dialect seems to be slightly changed by the interference of the widely used KDA. Yet, there remains to be a difference between the speakers that cannot be overlooked. This paper will look at the speech from the two dialects to identify the differences in pitch and pitch range. Before which, a brief view of intonation elements, and more precisely pitch elements, will be overviewed from the modern point of view and the British traditional view. A general look at intonation in Classical Arabic, and other Arabic dialects will also be shown. This will lead to a summary of major pitch and intonation elements in the two Kuwaiti dialects mentioned above. Later, the researchers will display and analyze the results of the recorded speech and provide conclusions in the light of the literature provided.

2. Literature Review

Phonology is concerned with the way sounds of a language behaves and organizes in a functional manner not in the way it articulates and is perceived (Alharbi, 1992: p. 37). The organization of sound, on the other hand, is divided into two main components: segmental (concerned with the structure of phonemes such as consonants and vowels), and non-segmental (concerned with syllables, words, phrases and sentences).

Crystal, a British pioneer in the field of supra-segmental, describes prosodic systems as being:

“sets of mutually defining phonological features which have essentially variable relationship to the word selected, as opposed to those features (for example, the segmental phonemes, the lexical meaning) which have a direct and identifying relationship to such words” (Crystal, 1975: p. 5).

2.1. Intonation

As part of the prosodic elements, intonation is defined as a phenomenon that has an obvious pitch contrast, and reinforces (or contradicts) contrasts in different utterances (Crystal, 1969: p. 196). Halliday identifies the importance of intonation as it corresponds to a clause. He states that “one clause is one tone group” (Halliday, 1970: p. 3). This is supported by Crystal (1969) who found that 80% of intonation groups consists minimally one element of clause structure, 40% contain two elements, while 30% of intonation groups consist three elements of clause structure.

Halliday (1967) divided intonation structure into three systems: tonality, tonicity and tone. Tonality is where the division of an utterance into intonation groups occurs. Tonicity, however, is the placement of the tonic syllable (a stretch of syllables) in the intonation group. Tone is concerned with the selection of primary tones (p. 10).

These three systems, however, are concerned with the formal level of linguistics. On the physical level, pitch perception (F0), nucleus (major pitch change or focus), and tone (pitch direction) are ways of identifying intonation (Hirst & Di Cristo, 1998: p. 4).

2.2. Tonality, Pitch and Tune

Tonality refers to the division of an utterance into intonation groups. That is, to set intonation boundaries to an utterance (ibid: 19). An intonation unit boundary is usually signaled by a terminal pitch movement in most languages (ibid: 35).

What Halliday calls tonicity, Ladd (1996) and Ladefoged (1996) refer to as pitch accent. To avoid confusion, “accent” will be used synonymous to “tonicity”. Pitch accent was defined by Ladd (1996) as being a characteristic of a pitch contour usually associated with pitch change (p. 45). To identify a prominent syllable, one should measure the minimum or maximum pitch. The term “pitch accent” was first used by Bolinger (1958), and Pierrehumbert (1980) afterwards. Nowadays, this term is used widely in linguistics.

In his 1996 book, Ladd uses the auto-segmental-metrical theory (AM) to phonologically describe contours in a series of elements that are distinguished elements. Pitch accent is one of the purposed elements. A pitch accent consists of a single H or L tone or a combination of two tones. The central tone of a pitch accent is usually indicated with an asterisk (e.g. H* or L*). The most identified theory of pitch accent was provided by Pierrehumbert (1980) who displayed seven accents: H*, L*, L* + H, L + H*, H* + L, H + L*, and H* + H (the latter being controversial) (p.30). Examples of the distribution of pitch accent can be seen below:

1) Her mother’s a lawyer.

H* H* + L

2) I read it to Julia.

L* H* + L

The unique part of the pitch contour is known as the nucleus (“tonic” in Halliday’s terminology). According to the British School, the contour is divided into three parts namely: head, nucleus and tail (Shon et al., 2018). The nucleus is the only obligatory part; therefore, in a monosyllabic utterance, the contour consists of a nucleus only. Although many theorists disagreed with the complete head-nucleus-tail theory of the British School, the main idea of a nucleus being the focus of the speech is retained. The fact that the nucleus is the last accent of a contour is mainly derived from the intonation contours of Western European Languages, especially when looking at question intonation (Ladd, 1996: pp. 210-213). The occurrence of a pitch accent following the nuclear accent proves that the nuclear accent does not necessarily occur at the end of contour.

Abercrombie (1991) states that it is not easy to distinguish accent from stress. He defines accent as word-level abstraction, while stress as actual manifestation in an utterance. Stress gives a word a different meaning or form. A good example of this is the words permit (noun) vs. permit (verb). Clearly, from the example, stress affects differences of vowel quality, intensity and especially syllable duration (ibid: 46-47).

Tone or tune, as referred to by Ladd (1996), is distinct pitch movements. A falling tune would normally occur in a reply to a question. A rising tune would normally be used to convey doubt, uncertainty and other forms of questioning; it could also be used to confirm information (p. 9). The combination of a fall and rise is also used to convey certain intonational messages.

When getting the pitch range (F0) one should consider the difference between men and women. The normal male voice range is 80 - 160 Hz, while women’s normal range is 180 - 340 Hz (ibid: 261). Yet, a high is a high and a low is a low according to the level of the speech contour.

Men prefer high pitch in women’s voices, according to numerous reports (Collins & Missing, 2003; Feinberg et al., 2008; Jones et al., 2008, 2010). Speech pitch, for example, is positively associated with men’s attractiveness ratings of women’s voices (Feinberg et al., 2008). Males often prefer female voices that have been manipulated to have a lower pitch. High voice pitch in women may signify fertility, as it is associated to variations in femininity (Feinberg, 2008; Bryant & Haselton, 2009).

2.3. Arabic Intonation

Although it was thought that Arab linguists did not pay attention to intonation, this was revealed to be untrue. In Arabic based studies, evidence is evolving on the supra-segmental variation along similar dialects and accents. Recently, many studies have highlighted evident variances in the scope and structure of the inventory of pitch and boundary across Arabic dialects (Chahal, 2001; El Zarka, 2017; Ali et al., 2017). There was no specific term given to intonation by Arab linguists; however, early in the twentieth century Ibn Jinni (1913) stated that one could praise by emphasizing a word:

/kæn walah radʒolan/

He was indeed a man.

By emphasizing the word /walah/ (indeed), the man's virtue is emphasized (Jinni, 1913: pp. 370-373). Other examples of emphasis were also given in his book.

Later, in the end of the last century, Annahaas (1986) also shows interest in intonation; more specifically, he discussed the difference between long and short pauses. He also shows how these prosodic features are grammatically connected to a full-stop and comma.

The Egyptian dialect is the first Arabic dialect to be studied extensively phonemically and prosaically. Birkeland (1952) started this study by sketching the relationship between stress and vowel quantity. He also covered some phonetic features which are related to pausal forms. Later, Harrell (1957) conducted a more sophisticated experiment on Egyptian juncture, stress and intonation. He identified word stress and sentence stress, and three types of pitch phoneme: high, mid and low. Many scholars followed in the study of Egyptian intonation; generally all studies showed similarities between Egyptian and English prosody.

A study of the Iraqi dialect of Arabic was also conducted. Alani (1963) draws several conclusions based on a recording of his speech and another person. He states that declarative statements usually start with mid-low pitch and descends to a low pitch. Commands may start with a mid-low pitch or high-level descending as well to a low level. Questions, however, always has a high pitch on the informative part of the question.

Riyadhi dialect study followed in 1965 by Badawi (1965). Although Badawi states that the recordings were poor and informants could not be located for further recordings, he makes several conclusions. He found that Riyadhi dialect consist of thirteen tones: ten final and three non-final tones.

2.4. Intonation Studies on the Two Kuwaiti Dialects

The only two studies conducted extensively on the Kuwaiti intonation were done by Alkhalifah (1982) and Alharbi (1992). The first was conducted on KBA. Alkhalifah's study was that of speakers who brought their tribal dialects with them when immigrating to Kuwait from suburban areas around it. Alkhalifah concludes that some utterances could be said as statements or questions relaying mainly on the pitch (rising contour for questions and falling contour for statement). The following example was given:

/mIdʒbil ræH/ (with a falling pitch accent it would be set as a statement, while with a Mijbil went rising it would be set as a question).

Statements, whether complete or not, carry falling contours, and rise-fall characterizes wh-questions and negations.

Alharbi's (1992) study focused on KDA intonation. He concludes that falling contours occur in declaratives, and rising contours occur for both interrogatives and exclamations. Commands, on the other hand, are accompanied with either

contours depending on the phonological and semantic environment. He also states that the contours are most clear in interrogations (96%) and declaratives (74%), and less obvious in exclamations (57%). In commands, these distinctions are relatively absent. This shows the unpredictability of intonation/grammar relationship. He finally concludes that most aspects of KDA intonation follow a universal correspondence.

In both Alkhalifah's (1982) and Alharbi's (1992) studies common features of KDA and KBA were found. The most distinctive of which is the tendency to list things individually (individual intonation groups); the repetition of words or phrases is also common in both dialects in an attempt to refocus information.

3. Methodology

The investigation was set by recording 12 speakers of Kuwaiti Arabic. 6 speakers speak Kuwaiti KDA half male and half female. The other six speak KBA 3 of which are male and 3 females. The speakers were all aged 20 - 24. The choice of a very particular age group was made to avoid discrepancies caused by age. The only ethnographic variable that was measured in the study was gender. The recordings total time was 15 hours and 37 minutes of spontaneous and controlled speech of small mono-ethnic groups (speakers of the same dialect) of no more than 3 persons. Consent was taken before recordings were made, and a general discussion started off the interview. The participants discussed many topics such as sports, politics, and financial matters. The researchers were moderators, but kept their speech limited so as not to affect the speakers. Then, the participants were shown pictures to identify objects, or they were asked to make questions from the pictures for the participants in the group.

The average pitch of the speakers was calculated, and the recording measurements were taken through PRAAT. The average was calculated in light of ethnic backgrounds, and gender. To identify male and female speakers in the results section, numbers were used. The number "1" after speaker's dialect refers to male speakers, and number "2" refers to female speakers. The results were analyzed using SPSS 14.0 to calculate mean and significance if any.

4. Results & Discussion

This paper will focus on analyzing the speech of two KBA and KDA speakers. Pitch accent and range will be closely analyzed to seek similarities and differences between the two dialects. Appendix A shows the test conducted to record the four speakers. The recordings are analyzed using PRAAT. Some segmental differences will also be listed briefly.

4.1. Statements

Three types of statements were investigated. A one-phrase statement and a two-phrase statement were investigated. In addition, a single word statement was examined.

The single word was a reply to the question “what is this?”, where a picture of the object was shown. The first object was a one syllabus word /bas^s/ (bus). The pitch was leveled in the speech of all four speakers. There was no significant difference in the mean pitch between the speakers. However, there seemed to be a tendency for an extremely slight rise of pitch accent in the end. **Figure 1** shows the slight rise in a one-phrase statement.

In the two-syllable word /kɪmbjutər/ (computer). The nucleus is on the syllabus /bju/ where the pitch is slightly raised for all speakers. Amazingly, all utterances end with a slight rise. The speakers sound as if unsure of their answer, although the picture was very clear. The pitch of a two-syllable word is clear in **Figure 2** and **Figure 3**. The mean pitch and accent varied between the KDA and KBA speakers as follows:

KDA1: F0: 125.7 Hz	max: 134.0 Hz	min: 119.9 Hz
KDA2: F0: 115.6 Hz	max: 120.2 Hz	min: 110.4 Hz
KBA1: F0: 143.3 Hz	max: 166.5	min: 138.8 Hz
KBA2: F0: 150.9	max: 143.6	min: 132.4 Hz

In one phrase statements, a question was asked “what is your name?” The answer for this question was the following:

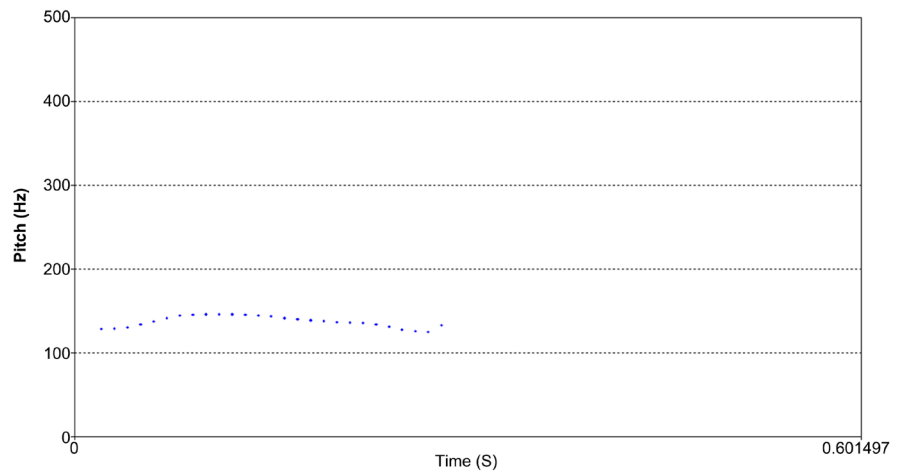


Figure 1. Pitch in a one-phrase statement.

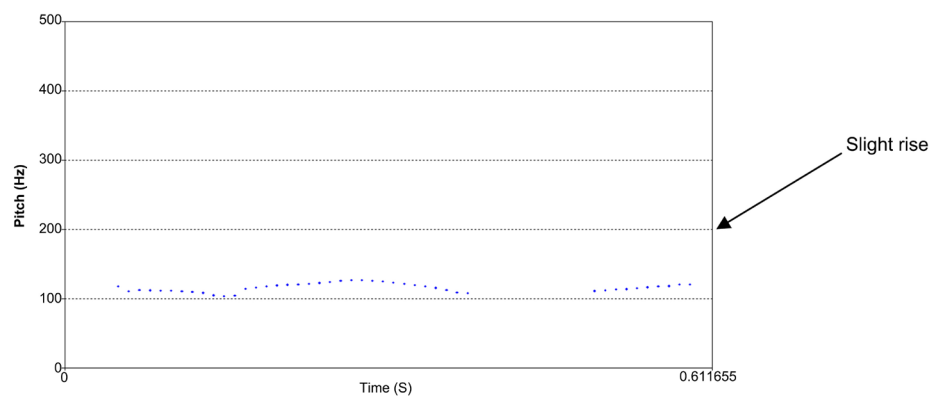


Figure 2. An example of a KDA two syllable (one word) statement.

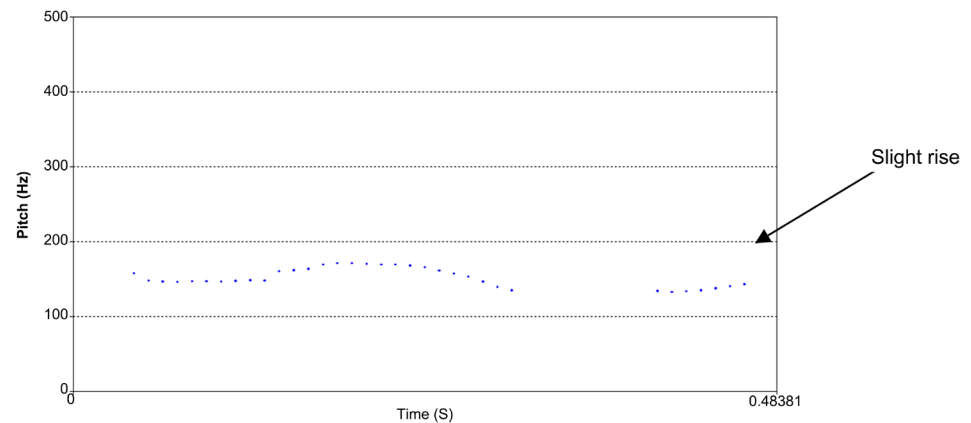


Figure 3. Another example of a KBA speaker.

/ɪsmi heifaʔ/
 My name Haifaa
 (my name is Haifaa.)

In this statement the nucleus is on /ɪs/ in /ɪsmi/. The KDA speakers started with a leveled pitch accent (neither high or low), while the KBA speakers have slight rise. All statements end with a fall (L*). However, the KBA have a clearer fall (as shown in **Figure 4** and **Figure 5**). The end of the utterance is mainly H + L* and the pitch calculations are as follows at the end of the contour:

KDA1: F0: 113.0 Hz	min: 96.1 Hz	max: 109.1 Hz
KDA2: F0: 112.2 Hz	min: 99.0 Hz	max: 116.5 Hz
KBA1: F0: 140.3 Hz	min: 109.9 Hz	max: 139.9 Hz
KBA2: F0: 125.5 Hz	min: 86.8 Hz	max: 136.7 Hz

As for the two-phrase statement, the statement was an answer to the question “where did Ahmed go?” The speakers had read a short story where Ahmed went to the field to play soccer and didn’t find anyone. As a result, their answer was as follows:

/ræħ aħməd əlmalʕab bəs mə lɪga aħad/
 Went Ahmed the field but didn’t find anyone
 (Ahmed went to the field but didn’t find anyone.)

The two-phrase statement ends with a fall in all statements. A significant pause between the two phrases is clearly evident in the KBA speakers’ utterance (0.717 msc for the first KBA speaker, and 0.358 msc for the second KBA speaker). The nucleus is the syllable /ma/ in /malʕab/ in the first phrase, and /aħ/ in /aħad/ in the second phrase. It is assigned a fall-rise-fall. The pitch range for the speakers was as follows:

Mean pitch for the two phrases:

KDA1: F0: 118.9 Hz	KDA2: F0: 114.8 Hz
KBA1: F0: 139.5 Hz	KBA2: F0: 136.5 Hz

In the first phrase the pitch accent for /ma/ H* + L was:

KDA1: min 1: 101.7 Hz	max: 129.4 Hz	min 2: 129.4 Hz
KDA2: min 1: 119.4 Hz	max: 125.2 Hz	min 2: 104.3 Hz

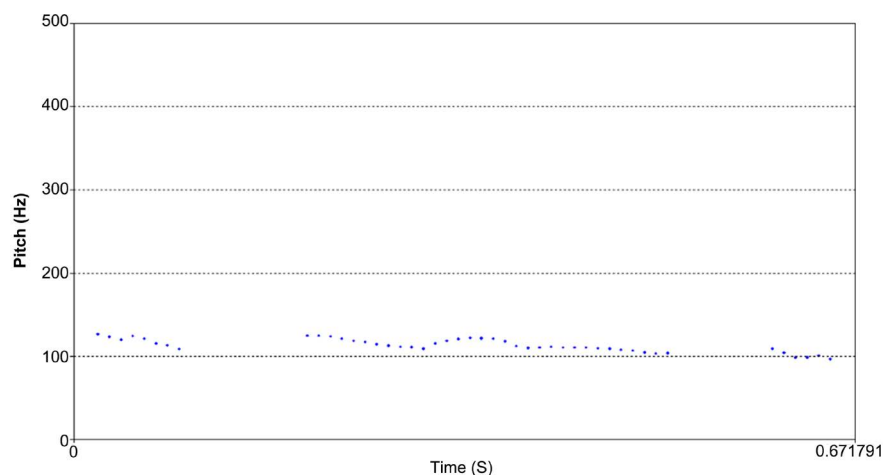


Figure 4. The KDA utterance of a one phrase statement.

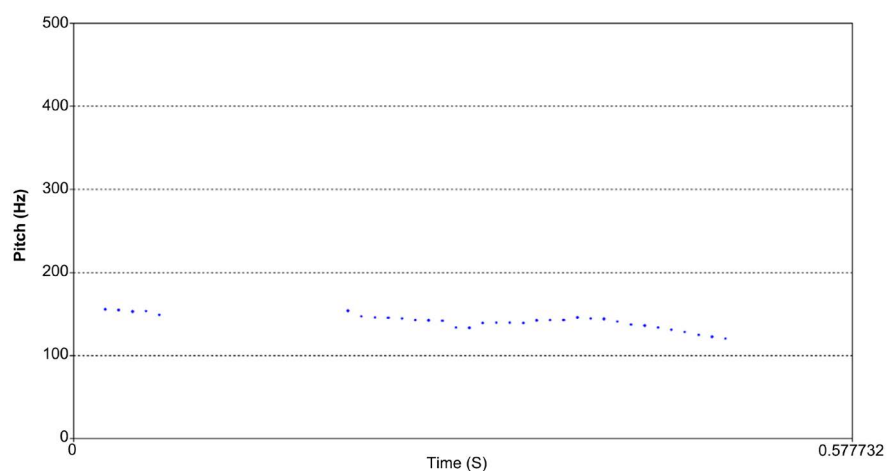


Figure 5. A clearer fall for the KBA speaker is evident in the phrase statement.

KBA1: min 1: 129.8 Hz max: 157.6 Hz min 2: 132.5 Hz

KBA2: min 1: 130.6 Hz max: 138.1 Hz min 2: 104.6 Hz

In the second phrase the pitch accent for /aħ/ in /aħad/ H + L* is:

KDA1: min: 93.0 Hz max: 123.6 Hz

KDA2: min: 90.7 Hz max: 102.1 Hz

KBA1: min: 112.6 Hz max: 126.7 Hz

KBA2: min: 123.0 Hz max: 125.0 Hz

A long pause was found in the speech of both groups, however, as shown in **Figure 6** and **Figure 7**, the pause is significantly longer in KBA.

4.2. Questions

Two types of questions were observed and analyzed. The first type is the wh-question:

/ʃəm jɔ:m bilsɪnə/

How many day in a year

(How many days are there in a year?)

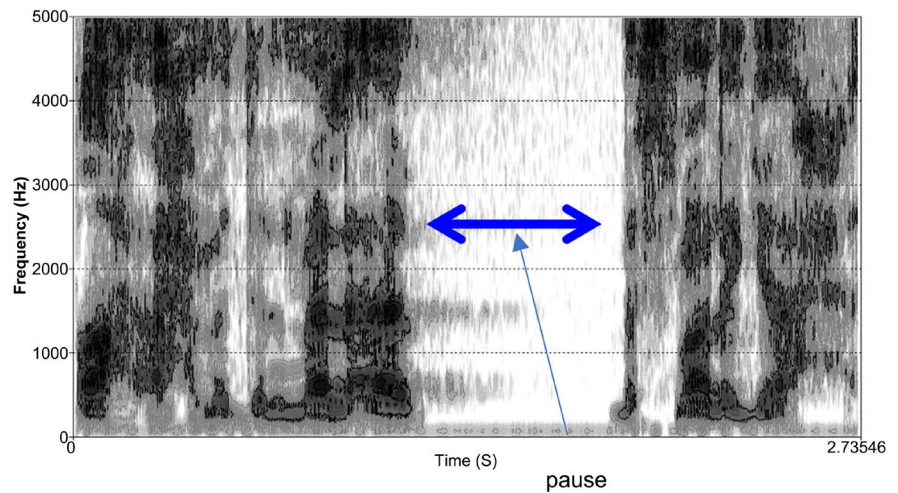


Figure 6. The long pause in the speech of the two KBA speakers (phrase 1).

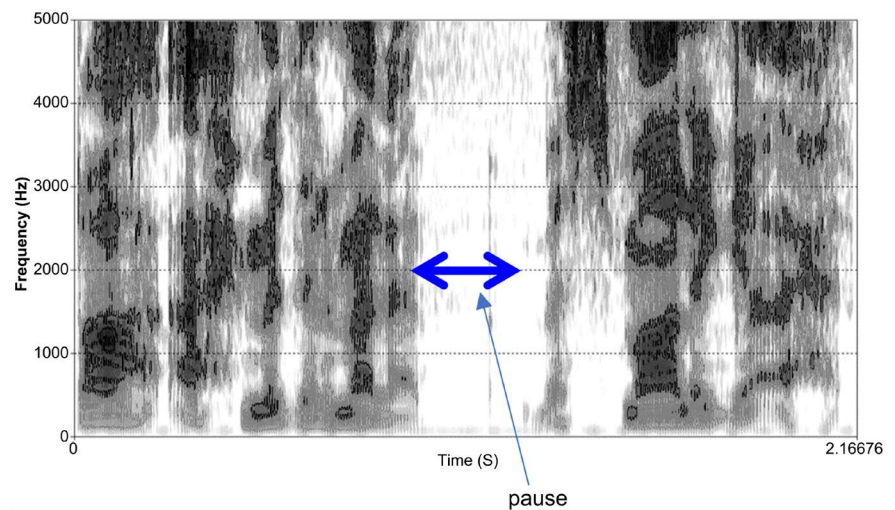


Figure 7. The long pause in the speech of the two KDA speakers.

The wh-question starts with a leveled pitch and ends with an extremely slight rise (average maximum of 120 Hz and average minimum of 110 Hz) in the KDA utterance. However, with the KBA speakers, the question starts with a rise and ends with a fall (H + L). Universally, questions have a final rise (as shown in **Figure 8** and **Figure 9**), thus it is quite surprising to find that KBA speakers have a fall in the end of their speech as the picture of the spectrogram below shows:

The following are the mean pitch (F0) for the four speakers:

KDA1: 118.3 Hz

KDA2: 123.3 Hz

KBA1: 152.0 Hz

KBA2: 159.0 Hz

The mean pitch seems to differ approximately 30Hz between the two groups. Usually, KBA speakers have a higher F0, but in this case it is higher than usual. Moreover, in a one-way ANOVA by gender, high significance was found as female speakers from both dialects have a higher pitch ($f \leq 0.01$).

The second type of questions is the tag question:

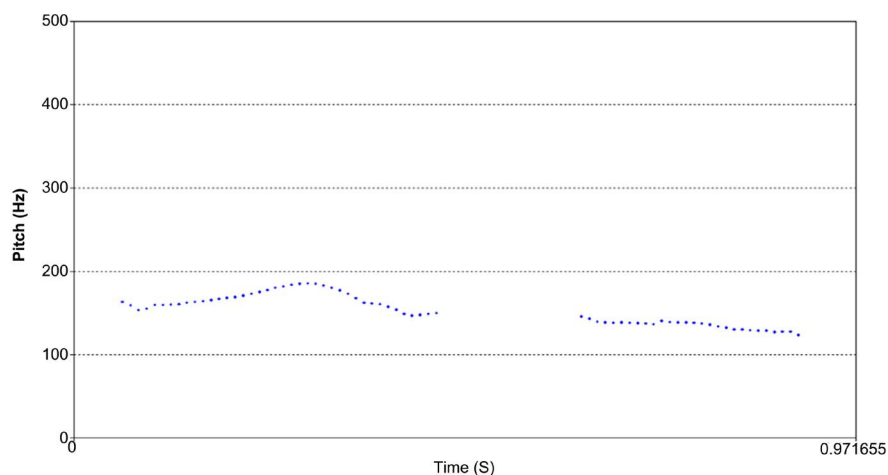


Figure 8. The fall in questions uttered by KBA speakers (phrase 1).

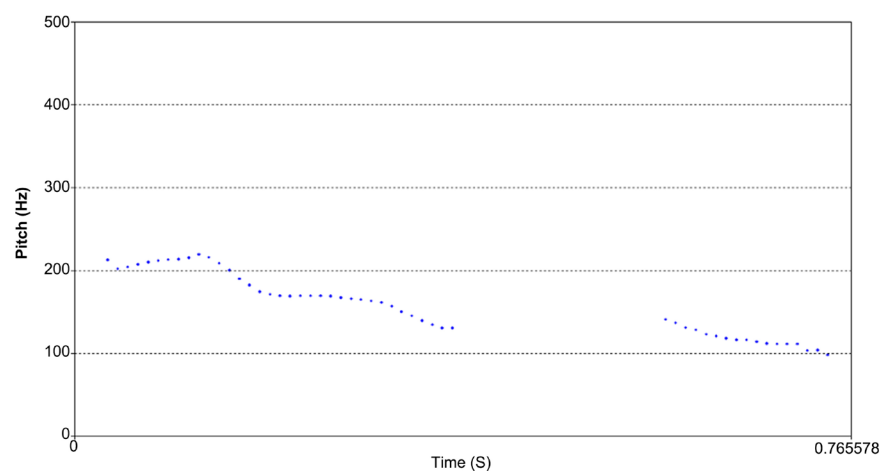


Figure 9. The fall in questions uttered by KBA speakers (phrase 2).

/əntai jəʕana s^haħ/

You(f) hungry right

(you're hungry, right?)

The tag question has two emphasized parts. The /ʕa/ in /jəʕana/ is the first nucleus, while /s^haħ/ in /s^haħ/ is the second. As shown below in **Figure 10** and **Figure 11**, all speakers showed a rise in the end of the question. Significance was found again by gender as the female speakers had a significantly higher pitch ($f \leq 0.01$). The tail could be described as a $L^* + H$ pitch accent. The following ranges were found:

For the first nucleus $L + H^*$ /ʕa/:

KDA1: F0: 118.4 Hz min: 106.4 Hz max: 130.8 Hz

KDA2: F0: 123.2 Hz min: 113.9 Hz max: 131.7 Hz

KBA1: F0: 152.9 Hz min: 125.9 Hz max: 154.0 Hz

KBA2: F0: 159.0 Hz min: 127.9 Hz max: 162.3 Hz

For the end of the utterance $L^* + H$ /s^haħ/:

KDA1: min: 121.6 Hz max: 137.5 Hz

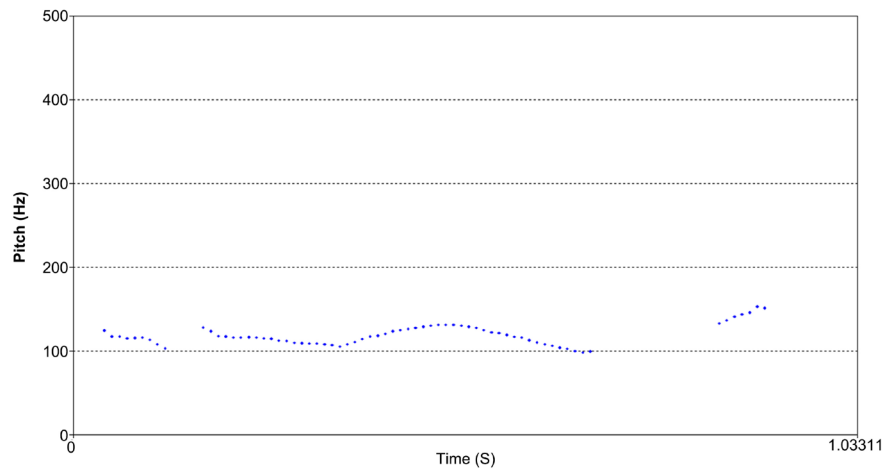


Figure 10. An example of the pitch contour in a KDA utterance of a tag question, with a clear rise.

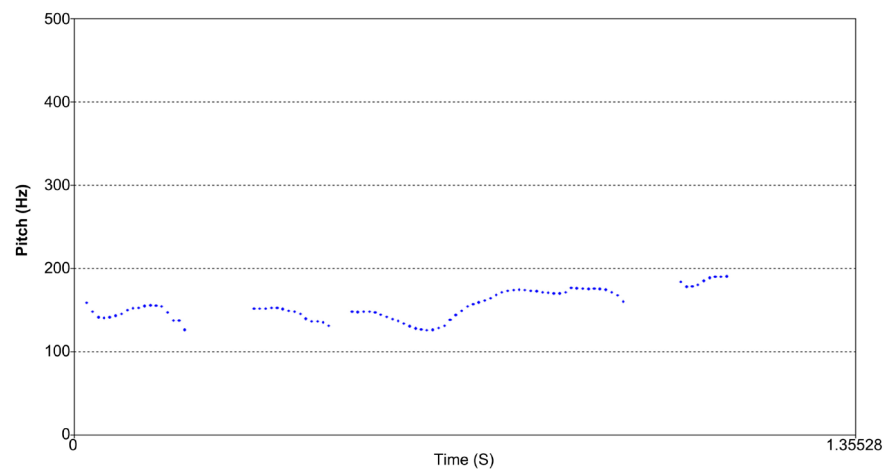


Figure 11. An example of a KBA utterance of a tag.

KDA2: min: 124.2 Hz	max: 152.8 Hz
KBA1: min: 160.3 Hz	max: 175.0 Hz
KBA2: min: 184.1 Hz	max: 189.9 Hz

4.3. Other Issues

Not only were intonational differences found in the speech of KDA and KBA speakers, but also segmental differences as well. As the limit of the paper binds us, we will review some of these segmental differences only.

The feminine word for hungry in KDA is /jɔʕana/, yet KBA speakers uttered it as /dʒɔʕana/. The replacement of /dʒ/ instead of /j/ is common in KBA. However, the word is also manipulated in KDA from Classical Arabic where /dʒ/ is changed into /j/. Another manipulation in KDA of the Classical Arabic consonants is the replacement of /k/ with /ʕ/, as in the word /ʕam/ (how much). KBA speakers usually pronounce it the Classical Arabic way where they pronounce it as /kam/. Therefore, KBA seems to be closer to Classical Arabic in this aspect.

In vowels, some differences were also detected. The feminine word for “you” in KDA is /əntai/ while in KBA it is /ənti:/. Where there is a tendency in KBA to feminize the words with /i:/ instead of /ei/. Although this is also a Classical Arabic feature, other vowel changes are not. The replacement of /u/ with /ɔ:/ is a feature that does not exist in Classical Arabic. An example for that is the word “ball”, which in KDA is /kɔra/ and in KBA is /kɔ:ra/.

The final difference is the emission of the final glottal /ʔ/. In KDA, as in Classical Arabic, this sound is found mainly at the end of some nouns as in /heifaʔ/ (A female name). In KBA it is pronounced /heifəh/.

5. Conclusions

This paper attempted to look at different aspects of intonation and focused mainly on pitch. There are many aspects of pitch that can characterize an utterance, and some are more complicated than others. The focus of this paper is simple statements, questions and tag questions.

Later, an investigation of the two main Kuwaiti dialects KDA and KBA was conducted to identify the differences between the two intonations. Pitch measurements were taken as well as the overall segmental differences in statements, questions and tag questions.

There seems to be little differences in pitch measurements between the two dialects in general. However, a closer look at the results shows that the pitch in KBA is higher almost always than in KDA. While the difference is not significant, it occurs in every test. Most maximum and minimum pitch measurements showed that KDA is less at about 20 Hz. From a statistical viewpoint, this difference is not very significant.

On the other hand, KBA speakers seem to have long pauses where KDA speakers do not. These pauses seem to indicate the separation of two phrases (as the grammatical comma break). This feature occurred mostly in statements. An amazing rise at the end of statements was clear in all the speakers’ speech, hearing the utterance; there seems to be hesitance in the speakers’ answers.

Investigating the features further, in every speech occurrence recorded, female speakers have shown a higher pitch. When analyzing the outcome, significance was shown in almost every instance. As shown in previous studies (Bryant & Haselton, 2009; Feinberg et al., 2008), female speakers have physical properties that promote higher pitch in speech, which men perceive as feminine.

The conclusion of this paper seems to agree with the conclusions of the two studies on Kuwaiti dialects briefly described above, yet slight contradictions occurred as the rise found in all statements, and the fall found in KBA questions.

Segmental differences were also evident. Vowels, more than consonants, seemed to differ between the two dialects. As there is not enough place for those differences to be detailed, a thorough investigation of these differences is recommended in future studies. It is clear, however, from the segmental differences that most vowel and consonant differences tend to be towards Classical Arabic

in KBA.

The current study reflected a difference in intonation, more specifically pitch, in two Kuwaiti dialects. The major difference found was a higher rise in KBA. The findings in this study go hand in hand with other language variation studies mentioned in the literature. Intonation differences are a sign of social identity differences, based on ethnic backgrounds. These differences define groups of people as being part of a social pact, belonging to a certain group. Once we understand these differences, we can understand the language's effect on people's social, political and even economic life. This study takes us one step forward in understanding the dialectal differences in Kuwait and the Arabian Gulf.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

- Abercrombie, D. (1991). *Fifty Years in Phonetics*. Edinburgh: Edinburgh University Press.
- Alani, S. (1963). *Phonology of Contemporary Standard Arabic*. Ph.D. Thesis, Bloomington, IN: Indiana University.
- Alharbi, L. (1992). *Formal Analysis of Intonation: The Case of the Kuwaiti Dialect of Arabic*. Ph.D., Edinburgh: Heriot-Watt University.
- Ali, A., Vogel, S., & Renals, S. (2017). Speech Recognition Challenge in the Wild: Arabic MGB-3. *2017 IEEE Automatic Speech Recognition and Understanding Workshop (ASRU)*, Okinawa, 16-20 December 2017, 316-322.
<https://doi.org/10.1109/ASRU.2017.8268952>
- Alkhalifah, F. (1982). *An Intonational Study of Kuwaiti Bedouin Arabic*. SAOS, Ph.D. Thesis, London: University of London.
- Annahaas (1986). Alfawaasil Asawtiyah fil-Kalam wa Atharuha Alla Al-Mawaqi' Annahawya. *Arab Journal for Humanities*, 24, 75-92.
- Badawi, E. S. (1965). *An Intonational Study of Colloquial Riyadh Arabic*. Ph.D. Thesis, London: University College.
- Birkeland, H. (1952). *Growth and Structure of the Egyptian Arabic Dialect*. Oslo: Jacob Dybwad.
- Bolinger, D. L. (1958). Intonation and Grammar. *Language Learning*, 8, 31-37.
<https://doi.org/10.1111/j.1467-1770.1958.tb01214.x>
- Bryant, G. A., & Haselton, M. G. (2009). Vocal Cues of Ovulation in Human Females. *Biology Letters*, 5, 12-15. <https://doi.org/10.1098/rsbl.2008.0507>
- Chahal, D. (2001). *Modeling the Intonation of Lebanese Arabic Using Autosegmental Metrical Framework: A Comparison with English*. Ph.D. Thesis, Melbourne: University of Melbourne.
- Collins, S. A., & Missing, C. (2003). Vocal and Visual Attractiveness Are Related in Women. *Animal Behaviour*, 65, 997-1004. <https://doi.org/10.1006/anbe.2003.2123>
- Crystal, D. (1966). The Linguistic Status of Prosodic and Paralinguistic Features in English. *The University of Newcastle upon Tyne Philosophical Society*, 1, 93.
- Crystal, D. (1969). *Prosodic System and Intonation in English*. Cambridge: Cambridge

University Press.

- Crystal, D. (1975). *The English Tone of Voice: Essays in Intonation, Prosody and Paralinguistics*. London: Edward Arnold.
- De Lattre, P. (1963). Comparing the Prosodic Features of English, German, Spanish and French. *International Journal of Applied Linguistics*, 1, 193. <https://doi.org/10.1515/iral.1963.1.1.193>
- El Zarka, D. (2017). *Arabic Intonation*. Oxford: Oxford University Press. <https://doi.org/10.1093/oxfordhb/9780199935345.013.77>
- Feinberg, D. R. (2008). Are Human Faces and Voices Ornaments Signaling Common Underlying Cues to Mate Value? *Evolutionary Anthropology: Issues, News, and Reviews*, 17, 112-118. <https://doi.org/10.1002/evan.20166>
- Feinberg, D. R., Debruine, L. M., Jones, B. C., & Perret, D. I. (2008). The Role of Femininity and Averageness of Voice Pitch in Aesthetic Judgements of Women's Voices. *Perception*, 37, 615-623. <https://doi.org/10.1068/p5514>
- Halliday, M. A. K. (1967). *Intonation and Grammar in British English*. Mouton: The Hague. <https://doi.org/10.1016/j.anbehav.2009.10.003>
- Halliday, M. A. K. (1970). *A Course in Spoken English: Intonation*. London: Oxford University Press.
- Harrell, R. (1957). *The Phonology of Colloquial Egyptian Arabic*. New York: American Council of Learned Societies.
- Hirst, D., & Di Cristo, A. (1998). *Intonation Systems*. Cambridge: Cambridge University Press.
- Jinni, I. (1913). *Alkhasa's*. Cairo: Academic Press.
- Jones, B. C., Feinberg, D. R., Debruine, L. M., Little, A. C., & Vukovic, J. (2010). A Domain-Specific Opposite-Sex Bias in Human Preferences for Manipulated Voice Pitch. *Animal Behaviour*, 79, 57-62. <https://doi.org/10.1016/j.anbehav.2009.10.003>
- Jones, B. C., Feinberg, D. R., Debruine, L. M., Little, A. C., & Vukovic, J. (2008). Integrating Cues of Social Interest and Voice Pitch in Men's Preferences for Women's Voices. *Biology Letters*, 4, 192-194. <https://doi.org/10.1098/rsbl.2007.0626>
- Ladd, R. (1996). *Intonational Phonology*. Cambridge: Cambridge University Press.
- Ladefoged, P. (1996). *Elements of Acoustic Phonetics*. Chicago: University of Chicago Press.
- Pierrehumbert, J. (1980). *The Phonology and Phonetics of English Intonation*. Cambridge, MA: Cambridge University Press.
- Shon, S., Hsu, W.-N., & Glass, J. (2018). Unsupervised Representation Learning of Speech for Dialect Identification. *2018 IEEE Spoken Language Technology Workshop (SLT)*, Athens, 18-21 December 2018, 105-111. <https://doi.org/10.1109/SLT.2018.8639650>