A Contrastive- Acoustic Study of Jacqueline Kennedy and the Actress Natalie Portman's Voice Qualities in the Film" Jacki".

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Abstract

As performers in a social world, we communicate with other people by sharing information on many different levels. Each utterance includes linguistic information and conveys much information about the speaker's identity. Variation in voice quality indexes information about the speaker and marks the speaker's identity as a unique individual. The present study aims to validate the belief that each individual has an inalienable voice print that can't be imitated. The study verifies that, even the more similar personality between two individuals, or the close position in society the variance is voice quality. The acoustic analysis is performed via analysing the acoustic parameters namely: the fundamental frequency, amplitude, intensity, duration and pitch of Jacqueline Kennedy and the actress Natalie Portman who performed Kennedy's character in the film " Jacki". The results show that Kennedy's voice quality is breathy; whereas, Portman's voice quality is falsetto. The study concludes that it is possible to recognise the

identity of any individual from the properties of her/his voice quality due to the fact that each person has an unparalleled voice print.

Key Words: voice quality, acoustic variables: F0, amplitude, intensity duration and pitch range

1. Introduction

The human voice is a means that is responsible for carrying speech, and it is vital in the acoustic environment. We spend all of our time and every moment of our life listening to human voices rather than other sounds. As listeners, we are able to analyse and categorise information involved in voices in human social conversation. The human voice convies identity information in invariant properties as timbre that is directly affected by physical parameters such as age and gender, and dynamic information that relates to variations in pronunciation or differences among individuals (Belin et al, 2004, p.129).   Laver (1980, p.1) states that voice quality of an individual speaker in everyday interaction reflects an audible signal of her/his identity , personality, and mood. Voice quality is a term used in two orientations. In a broad sense, it represents the individual speaker's voice. However in a narrow sense, it shows the quality that results from the laryngeal activity .

Voice quality is developed by the phoneticians Abercrombie (1967) and Laver (1980-1994). Abercrombie (1967:91) states that this term refers to "those characteristics which are present more or less all the time that a person is talking: it is a quasi- permanent quality running through all the sound that issues from his mouth". Laver (1980, p.1) defines it as "the characteristic auditory colouring of an individual speaker's voice". The components that compose voice quality are of different types, those which are innate and can be said to be outside the speaker's control. They indicate physical markers such as gender, age, physique, and state of health. What attracts attention are the differences between the voice quality of a man, the voice quality of a woman, and the voice quality of a child which are the outcomes of such physical characteristics (Abercrombi,1967, p. 92) .

Other components that affect voice quality are not innate such as social markers that refer to social characteristics , such as social affiliation, social and educational status, and psychological characteristics that reflect the speaker's "tone of voice". Voice quality is a confusing term; it is defined in various ways. It refers to laryngeal qualities or a specific phonation type such as "breathy Voice, creaky Voice, whispery voice, falsetto" ,in a general sense, it describes the speaker's voice, for example (pitch , loudness , and phonation types).

2. Laver's Voice Quality Schema

Two aspects are used to describe voice quality : **Time frame** and **settings** (Laver,1994,p. 14). Voice quality is defined as the time perspective of the vocal properties. Voice features can be short–term, medium-term or long-term. Each of these facets of the time perspective corresponds to different functions that are attached to them: linguistic, paralinguistic, and extralinguistic (Laver and Trudgill,1979, p. 6; Laver, 1994, p.12), as shown in the clarification below.

a. **Short-term features of time frame**: They are a facet of the time- perspective of vocal performance, which refer to the speaker's permanent voice. In this case, the individual's speech is recognizable even though her/his consonants and vowels are unclear, for instance, when the speaker talks from a farther distance or behind a closed door.

b. **Medium-term features of time frame:** These features of the speaker's voice convey a paralinguistic function. Laver (1994, p. 21) affirms that a paralinguistic feature is communicative and that it is non-linguistic and non-verbal, but it is coded to convey two aims: first the speaker's emotional state (such as anger, sadness, happiness, excitement, and disappointment), and second to plan the time-sharing of the conversation. These features are described by the tone of voice. Paralinguistic components have both communicative and informative functions, however, they differ from linguistic features in that they lack the sequential structure (Laver and Trudgill, 1979, p.15; Laver, 1994, p. 22).

c. **Long–term features of the time frame**: These features represent the extra function. Extralinguistic aspects convey information about the speaker's identity, particularly the habitual factors of her/his voice quality, range of pitch, and loudness. Thus, the extralinguistic function is informative but not communicative (Laver and Trudgill, 1979, p. 15; Laver, 1994, p. 22).

d. Voice Quality Settings

Voice quality settings, they refer to how the speaker habitually speaks. Settings are a tendency for the vocal apparatus to sustain a given arrangement over a long stretch of segments. For example, an individual may talk routinely with a nasal voice quality, then the nasal features are shared by segments throughout her/his speech. In this case the nasal settings are used on nasal and non-nasal sounds (

Biemans, 2000, p. 21) . Voice quality settings can be described as idiosyncratic to the speaker. For instance, an individual speaker may choose to pronounce all of his or her speech with a whispery voice quality, because s/he thinks this seems attractive (Laver and Trudgill, 1979). The difference between anatomical voice quality and voice quality settings is that the former involves permanent features that cannot be under the control of the speaker; they represent physical features among speakers, while voice quality settings can be learned and imitated (Biemans, 2000, p.21).

Laver (1980, pp. 23-156) differentiates among three types of settings. First, the supralaryngeal settings of the vocal cords which indicate the modification of the shape and acoustic characteristics of the tract, including the external parts of the larynx, lips, jaw, tongue, and velum. Second, the phonatory settings that are associated with the different phonation modes, including the vocal cords and the surrounding muscles. Third, the tension settings which are related to different degrees of muscular tension throughout the vocal apparatus. Each type of these settings consists of several sub-settings. Laver (1980, p.14) begins his schema with a standard setting which is described as the neutral settings. Below a description of each of these settings is given.

- **The Supralaryngeal Settings**

The neutral configuration of the superalaryngeal vocal tract is used as a reference for other settings. The modification in the neutral configuration leads to one of these sub-settings: longitudinal settings, latitudinal settings, and velopharyngeal settings.

- **The Longitudinal Settings**

The modifications of the longitudinal axis of the vocal tract result from a succession of four different types of modification of vocal organs of their natural position. The first two types show a vertical displacement of the larynx, upwards or downwards, resulting in a raised larynx voice and a lowered larynx voice, respectively. The third type of modification is concerned with the protrusion of the lips; and the last type includes the raising and retraction of the lower lip (Laver, 1980, pp. 23-24), as shown in Fig.(1)
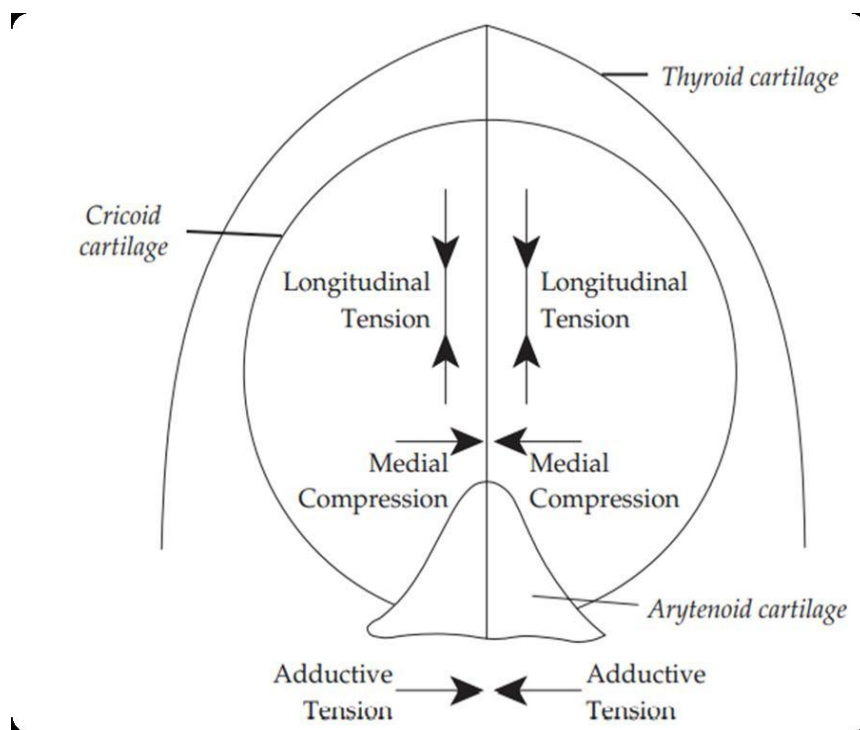
Fig.(1): The tension and modification forces (adopted from Gobl and NI Chasaide,2010:395)

- **The Latitudinal Settings**

Laver (1968, p. 46) confirms that the latitudinal settings include quasi- permanent changes in the cross-sectional area to keep a particular expansive effect on the cross-sectional area along the length of the tract . Different organs participate in producing such settings. Latitudinal settings involve five groups relying on the responsible organ: labial settings(lips), lingual settings (tongue), faucal settings (faucal pillars) pharyngeal settings (pharynx), and mandibular settings (jaw) (Laver,1980, pp. 34-63) .

- **The Velopharyngeal Settings**

Laver (1968, p.47) differentiates between two terms, nasalised voice and denasalised Voice. These settings result from the modification in the velum. Denasalised voice is produced from a velic closure, which happens when the velum is raised to prevent the air from passing through the nasal cavity, leading to a complete lack of nasal resonance. On the other hand, nasalised voice results from a partial nasal cavity blockage, allowing the nasal cavity to become resonant. Thus, the responsible organ for modifying such settings is the velum, which acts as an

automatic device or as a valve that opens and closes the nasal cavity to make the air pass throughout the nose or the mouth.

- **The Phonatory Settings**

The larynx is used as a source of producing sound in the phonation process; phonation results from the laryngeal system. One can look at the construction of the larynx to understand the process of phonation. Three laryngeal cartilages regulate the basic construction of the larynx with the aid of the surrounding muscles, which control the phonation process; these are the thyroid, the cricoid, and the arytenoid cartilages. The larynx cartilages are responsible for the degree of modification that changes the phonation modes. The vocal cords are situated between the larynx cartilages and, more precisely, between the front and back of the larynx (Laver, 1980, pp. 94-101),as is shown in Fig.(2)
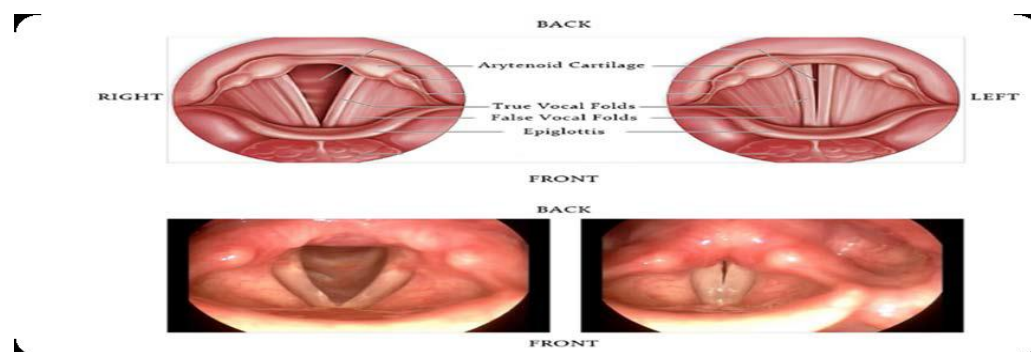

Fig.2: The Position of the Vocal cords

The phonatory settings are   habitual configurations of the laryngeal apparatus, including the vocal cords and the surrounding muscles. Four phonatory settings are categorised as a modal voice, whispery voice,creaky voice, and harsh voice (Biemans , 2000, p. 23), as follows:

- **Modal Voice.** The neutral voice of phonation is characterised as an aperiodic and efficient vibration of the vocal cords without audible friction. The term "modal voice" is adopted for the neutral mode of vibration by Hollien (1971). Marchal (2009, p. 60) affirms that in producing a modal voice, adductive tension and medial compression are moderate.

- **Breathy Voice** , is associated with audible friction. Since muscular effort is low, it keeps the glottis relatively open, preventing the vocal cords from contacting the middle part. The mechanism of producing this voice shows that it is produced with a narrow glottis in the central line but not as narrow as in producing a whisper. The vocal cords vibrate, without any closing that allows air to go out, resulting in

both voicing and some friction noise. Impressionistically, breathy voice is "soft "and "quieter" than other voices; it is often associated with passionate speech and TV. models of cosmetics advertisements (Poyatos, 1991, p. 182; Ogden, 2009,p. 50)

- **Whispery Voice**: The airflow passes through a very narrow passage through the glottis, and causes the airflow to be turbulent. Speaking with a whispery voice is used by speakers to talk quietly or secretively (Ogden, 2009, p. 51). Poyatos (1991, p. 198) clarifies three types of whispered speech: soft whispered voice by the speaker expressing secrecy; a normal whispered voice used in the theatre; and a forced whispered voice , used necessarily on stage and to express confidentiality.

- **Creaky Voice**. In the production of a creaky voice the vocal folds are adducted, relatively thick, and seemingly compressed. Likewisw,the ventricular folds adduct ,and the lower surface of the false folds comes in contact with the higher surface of the true vocal folds. Therefore, an unusually thick and compressed structure of the vocal folds is made before the initiation of the phonation (Hollien et al., 1966, p. 247). In the paralinguistic of interaction system, a creaky voice is used by speakers with a falling intonation to show their completion of turns as speakers. A creaky voice indicates a bored resignation (Laver,1980, p. 126), and it is used to express commiseration and complaint (Brown and Levinson,1978: 272), as cited in Laver (1980, p. 126). Poyatos (1991, p. 183) asserts that laryngealized or creaky voice can be utilised attitudinally to reflect boredom, unwillingness, attitudes, admiration, or sympathy.

- **A Falsetto voice** , is produced with a high tension throughout the larynx, a stretching and thinning of the vocal cords, and the glottis is partially closed. To produce a falsetto voice, there should be a high average of the speaker's F0 to extend beyond its normal range; that is why singers use this type of voice (Ogden,2009, p. 52) . The vocal cords expand longitudinally from the front to the back in producing a falsetto voice, so that the longitudinal tension makes the expansion and thinning of the vocal cords (Laver,1994, p. 197). Falsetto voice has some acoustic characteristics. First, a falsetto phonation has a higher fundamental frequency than other types of phonations, more precisely, than a "modal voice "(Laver,1980, p. 119). Second, the quality of tone that is produced by a falsetto voice is almost flute-like in nature, that is because of the high fundamental frequency and the mode of vibration of the vocal cords (Zemlin, 1966, p. 155); as cited in (Laver, 1980, p. 120). The third acoustic characteristic is the opening portion of the

laryngeal waveform which is steeper in a falsetto voice (Monsen and Engebretson, (1977,p. 988), as cited in (Laver, 1980, p. 120).

- **Harsh Voice**. A harsh voice is described as having a rough, throaty quality. It occurs because of the severe tension of the whole larynx muscles. The upper muscles are under extreme constriction, with the compression of the ventricular folds (false folds) from the upper surfaces of the true folds, causing an ineffectual vibration. All these conditions affect the voice, leading to a distinctive strained voice (Laver, 1994, p. 420). The acoustic characteristics of a harsh voice are determined from the irregularity of the glottal–wave form and the spectral noise. The main acoustic feature that differentiates a harsh voice from other voices is the irregularity and aperiodicity of the noise in the vocal cords spectrum (Fairbanks, 1960), as cited in (Laver, 1980:127). Paralinguistically, a harsh voice is a signal of anger (Laver,1980, p. 132). Poyatos (1991, p. 184) states that harsh voices express negative attitudes and feelings such as cruelty, rejection, scorn, and violent emotions.

- **Compound phonation types**

From a physiological point of view, modal and falsetto voices are incompatible because each of them use the same laryngeal apparatus differently. Thus, they cannot be generated at the same time. On the other hand, whisper and creak cannot occur simultaneously; however, they can modify modal and falsetto voices, and each other. Combining two phonation types produces a whispery voice, a whispery falsetto, and a whispery creak. Triple combinations can result in whispery creaky voice and whispery creaky falsetto (Laver, 1994, p. 198).

- **Tension Settings**

Laver (1994, pp. 416-20) distinguishes two major settings: the supralaryngeal and laryngeal tensions, manifesting in tense voice versus lax voice. A tense voice represents articulation, and a lax voice represents phonation. A tense voice is defined as a harsh phonation mode. It results from a high subglottal pressure, with a high degree of tenseness in the supraglottal part of the vocal tract; it begins from the pharynx and the oral cavity (Laver, 1980, p. 155). The increased muscular tension is a physical characteristic correlated with a tense voice, which probably affects the respiratory system, causing an increase in the subglottal pressure. A supralaryngeal lax voice can be described as 'a gentle', 'soft ' phonation. It results from a lesser amount of tension throughout the vocal tract. A lax voice tends to have opposite properties to a tense voice. Its phonation is the same as that of the

breathy voice because of the reduction of the adductive tension and medial tension-compression , which seems to be softer and lower in pitch than in a modal voice (Gobl and NI Chasaide, 2010 , p. 402).

3. Hypothsis of the Study

The study hypothesizes that :
1. Each individual has a unique voice quality that discriminates her/him from others.
2. The variance in voice quality determines the speaker's identity.
3. It is impossible to imitate another person's voice, even though professionals are in this field, because voice quality is a speaker's voice print.

4. Study Objectives :

The present study aims to:
1. Investigate the acoustic properties of the voice qualities of both Jacquline Kennedy and the actress Portman who performed Kennedy's character and imitated her voice quality in the film " Jacki".
2. Investigate the differences between Kennedy and Portman's voice qualities.
3. Explore to what extent Portman was successful in imitating Kennedy's voice quality.

5. Literature Review

Many researchers have discussed and investigated speakers' voice quality and have showed the relationship between the speaker's voice and her/his identity.   A study is conducted by Robert J. Podesva and Patrick Callier (2015) which is entitled" Voice Quality and Identity" confirms that the variance in voice quality serves many functions. Voice quality indexes information about speakers in an interaction or identifies the speaker as a unique individual. The study focuses on the link between the voice and the uniqueness of the speaker's body. It is considered a theoretical contribution to investigating how much the voice acts as an index of a speaker's whole personhood. Thus, the researchers seek to realise the relation between speech and identities.

Lee, Yoonjeong, et al. (2019) describe a set of principal component analyses to investigate within-and between talkers' acoustic variation. The study which is entitled" Acoustic variation within and between speakers" hypothesised that measuring the acoustic parameters among speakers would be important, but it

would be much more peculiar within speakers. The data of the analysis were in the form of multiple sentences produced by 50 male and 50 female speakers of English. Twenty-six acoustic parameters from a psychoacoustic model of voice quality were measured every 5ms on vowels and approximants. The principal component analysis provides variability in voice quality within and between speakers and shows how the acoustic properties reveal voice spaces individually and generally. The results show that the balance between high-frequency harmonic and inharmonic energy and formant depression appear among speakers, but it was more characteristic within -speakers. Furthermore, the result verifies similar acoustic values between individuals and general voice spaces.

In (2016), a study is produced by Meireles Alexandro R. It is based on the voice profile analysis scheme(VPAS) and the acoustic strategies of high registers of heavy metal singing. The data of the study involve two professional and amateur singers who produced Iron Maiden's Aces High with two very high register excerpts selected from the song. Vocal coaches, speech therapists, and phoneticians were appointed as experienced judges. The study is based on the software Voice Sauce to analyse the acoustic parameters of long-term measures. The results show a clear distinction between the articulatory strategies of amateur and professional singers. The findings affirm that the experienced singers maintain a higher tension in the vocal tract and the vocal folds; than amateur singers. Furthermore, the professional singers continued with an open jaw posture and a raised larynx vocal position to get the high notes. However, these settings are not observed in the voice qualities of amateur singers.

6. Methodology

This section concerns the details of the managed data analysis and the procedure used in the present study.

6.1 Procedure of collecting the data

To conduct a contrastive study, the researchers collected the data of the study, which is the speech of Jacqueline Kennedy and the same speech that has said by the actress   Natalie Portman who performed Kennedy's character in the film "Jacki." To show to what extent she performed and imitated Kennedy's voice quality , the researcher recorded the corresponding speech of both characters and does the following procedures:

1. Choosing Mrs Kennedy's speech of White House Tour 1962 as the first lady who opened the doors of American's home to the Tv. Viewing public , retrieved from https://youtu.be/8-ZyLJvXQQo . To explore whether the actress succeeded in imitating Kennedy's voice quality, the researchers selected the same speech as said by Portman in the film "Jacki."

2. Sorting the data into utterances by using the software computer program (SOUND FORGE pro suit)(version 14.0,2020).

3. Analysing the utterances acoustically by using the software computer program) PRATT doing phonetic by computer) (version 6.1.16, 2020), to verify the differences in Kennedy and Portman's voice qualities , and to show whether the latter succeeded in imitating Kennedy's voice quality.

6.2 Data Analysis and Results Discussion

The study aims to examine the acoustic properties of six corresponding utterances that Kennedy and Portman produced. The investigation of the acoustic properties will determine the type of Kennedy's voice quality and check if Portman succeeded in imitating it. The acoustic analysis results reveal the following values, as shown in table(1) that describes Kennedy's voice quality as breathy, whereas Portman's voice quality is a falsetto one.The data of the study as composed of the following utterances:

1. " it's attic and cellar all in one"
2. " since our work started"
3. " we receive hundreds of letter everyday"
4. "this is where we evaluate all the finds"
5. " I really don't have one"
6. " I think it is lovely"

Definitely, no speaker ever says exactly the same words in the same way twice, and this is   reveald by the results in the following table. The results of the analysis verified the varaiation in the voice quality that is produced by Kennedy and Portman who tried to imitate her voice.The difference is clear whether the voice quality intentionally or incidentally manipulated, as shown in table(1).

Table (1) Values of the acoustic properties that identify the type of voice quality

Reading values of the selected words		F0 Hz.		Intensity dB		Amplitude		Dur.Time/sec.		Pitch Ran	
		Jac.	Nat.	Jac.	Nat.	Jac.	Nat.	Jac.	Nat.	Jac.	N
1st utterance	1	200.5	205.6	80.39	70.83	0.9914	0.2258	0.469735	0.363958	170.58	20
	2	207.1	191.6	83.73	71.21			0.315603	0.470282	191	17
2nd utterance	1	184.5	199	81.33	73.52	0.8672	0.2403	0.251840	0.301389	167.12	19
	2	194	190.6	81.15	71			0.535903	0.661179	162.2	18
3rd utterance	1	169.5	185	81.34	72.17	0.9938	0.2515	0.556160	0.619687	160.36	17
	2	161.6	173.8	79.46	70.35			1.015292	1.153365	151.36	17
utterance		311	248	82.40	77.30	0.7986	0.3066	1.683787	1.802381	218	24
utterance		234.9	261.4	80.59	69.102	0.7030	0.2842	1.971134	1.749206	199.41	20
utterance		207.9	204.1	82	71.51	0.802	0.2326	0.756508	1.023288	211.8	20

The results of the overmentioned analysis reveal the variation in the acoustic parameters namely: the fundamental frequency, amplitude, intensity, duration, and the range of pitch, as shown in the following figures:
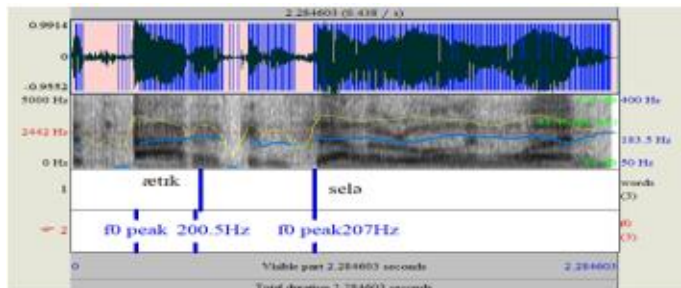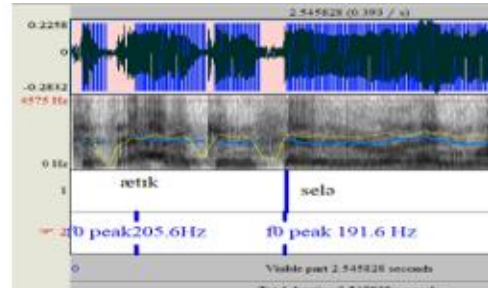

Fig.(1) Kennedy's waveform of the 1st utterance

Fig.(2) Portman's waveform of the 1st

These two figures represent the waveform of the first corresponding utterance that Kennedy and Portman said, "it's attic and cellar all in one." The researchers have selected two particular words and measured the acoustic parameters to investigate if Portman succeeded in imitating Kennedy's voice quality. The results show that there is an evident variation in the reading values of the acoustic parameters, Kennedy produced the first-word "attic" with a lower F0 than Portman, whereas the second-word " cellar " is uttered with a higher F0 by Kennedy, than Portman. The acoustic values of the other parameters also reveal the variation that Kennedy produced these two words with a higher intensity and amplitude than

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Portman. Moreover, the word" attic" is said with a longer duration by Kennedy, whereas the word" cellar" is uttered with a longer duration by Portman. The analysis of the mean pitch also shows the difference in the way Portman imitated the .

The results of the second utterance confirm the distinction in the production of voice quality. The reading values of the two words " work" and " started" prove a variation in the acoustic properties. The word " work" uttered with a lower F0 by Kennedy than Portman, whereas the word " started "produced with a higher F0 by Kennedy than Portman. Kennedy produced " work" and " started " with increased intensity and amplitude compared to Portman. The measurement of duration proves that the two words are said with a longer period of time and with a higher pitch by Portman than Kennedy, as it is shown in figures (3) and (4):
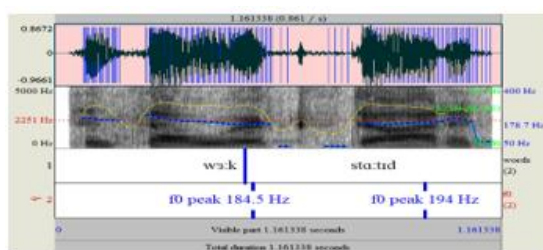
Fig.(3) Kennedy's waveform of the 2ⁿᵈ utterance   Fig.(4) Portman's waveform of the 2ⁿᵈ utterance
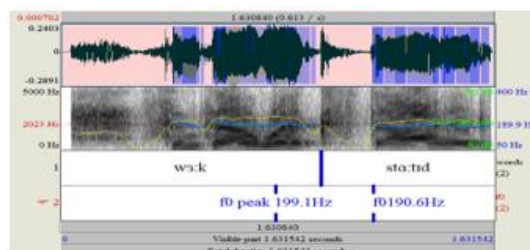
The acoustic values of the third utterance " we evaluate all the finds" show a difference in the reading values. Both "evaluate" and the phrase "all the finds" are uttered with a lower F0 by Kennedy in contrast to Portman who uttered them with a higher F0. However, the values of the other parameters show that Kennedy produced " evaluate" and" all the finds with increased intensity and amplitude , but with a decreased pitch, in contrast to Portman. On the other hand , Portman produced " evaluate" and " all the finds" with a decreased intensity , amplitude and with an increased pitch and a longer decreased pitch, in contrast to Portman. On the other hand , Portman produced " evaluate" and " all the finds" with a decreased intensity , amplitude and with increased pitch and a longer period of time than Kennedy , as in the following figure:
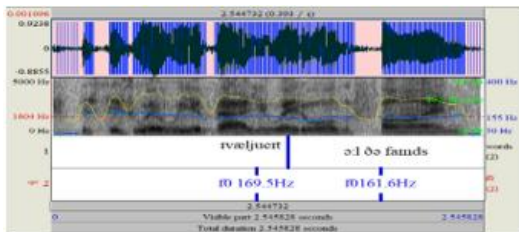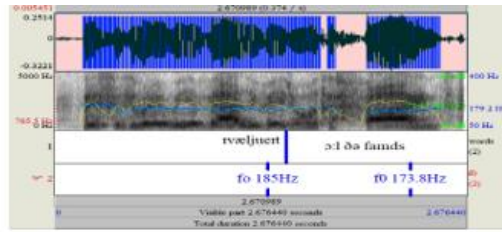
Fig.(5) Kennedy's waveform of the 3rd utterance

Fig.(6) Portman's waveform of the 3rd utterance

The results above verify the variation in the acoustic parameters of particular identical words uttered by Kennedy and Portman. The actress Portman succeeded in imitating the external appearance of Kennedy and tried to produce a similar voice quality to that of Kennedy. The results of the samples mentioned above prove differences in the acoustic parameters while uttering certain words. We will analyse a sample of entire utterances and examine the acoustic parameters as shown in the following figures:
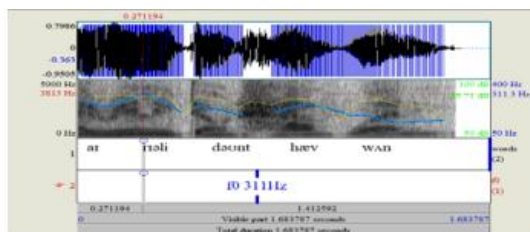

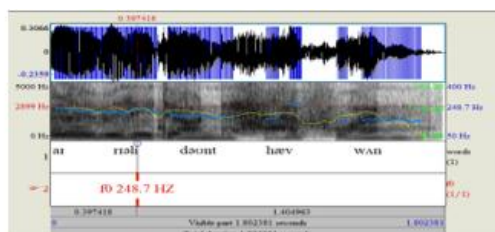Fig.(7) Kennedy's waveform of the 4th utterance

Fig.(8) Portman's waveform of the 4th utterance

The results of the acoustic analysis of the utterance " I really don't have one" reveal a clear variance in the acoustic parameters between both speech waveforms. Kennedy produced it with a higher F0 and with increased intensity and amplitude than Portman. However, Portman produced " I really don't have one" with a higher pitch and a faster speech rate in contrast to Kennedy .

The fifth utterance that was said by Kennedy and reproduced by Portman is " I think it's lovely." The acoustic analysis manifests that Kennedy uttered it with a lower F0 and increased intensity and amplitude, and with a lower pitch than Portman. Furthermore, Portman said it with a higher F0 and under a higher pitch range with a faster speech rate than Kennedy , as shown in the following figures:
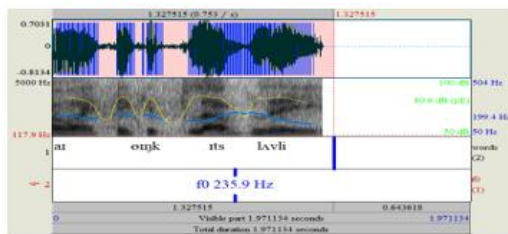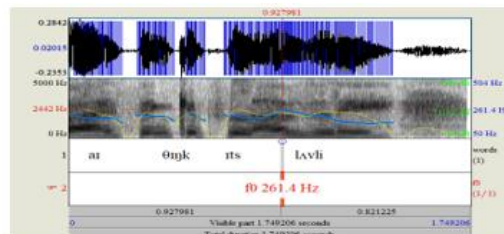
Fig.(9) Kennedy's waveform of the 5th utterance

Fig.(10) Portman's waveform of the 5th utterance

The acoustic results of the last utterance show the contrast in the values of both speakers' acoustic parameters . Kennedy says, " it's wonderful" with a higher F0 , increased intensity, amplitude,with a higher pitch, and in a shorter way than Portman says it, as is shown in the following figure:
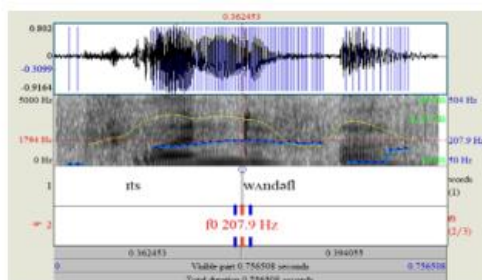

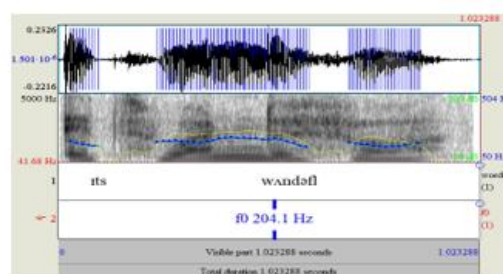Fig.(11) Kennedy's waveform of the 6th utterance

Fig.(12) Portman's waveform of the 6th utterance

Laver(1994: 198) describes a breathy voice as a very gentle resulting sound. A breathy voice is usually produced as a result of "the glottis is kept open a long of its length". The vocal cords vibrate but never stuck together", this case gives a sighing feature during speech production. The acoustic analysis results of Kennedy's speech correspond with Laver's description of a breathy voice.

On the other hand, Portman succeeded in imitating Kennedy's character in the film Jacki , but the acoustic analysis reveals that Portman produced a falsetto voice. Furthermore, Portman has an innate or inherent voice quality which is falsetto. The researchers examine an utterance said by her in one of her interviews and analysed the same acoustic parameters as in the following figure:
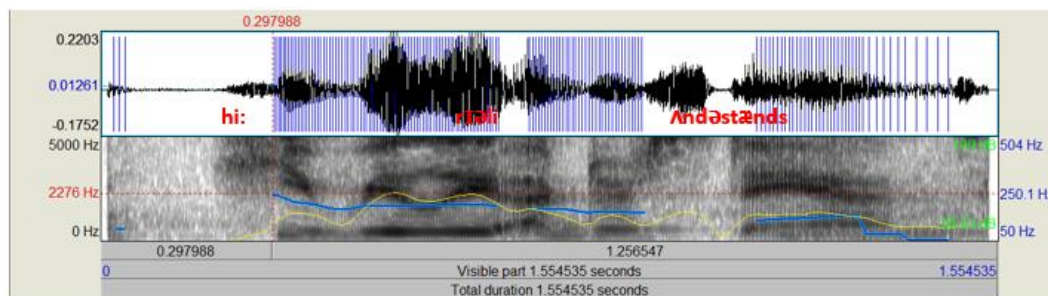
Fig.13 Portman's waveform of her own speech about her film VOX LUX , interview on BBC

The results show that Portman produced " he really understands" with a high F0 (250 Hz), amplitude(0.2230) , and intensity(64.55 dB) with an uncontrollable pitch. All of these values correspond to the acoustic characteristics of the falsetto voice.

7. Conclusion

Acoustic variables are vital in investigating a speaker's identity by detecting voice quality. As it is possible to identify a dead man and reveal his identification via DNA analysis, it is possible to investigate the identity of a living man via his voice quality. Voice quality can be described as a print or DNA proving a speaker's identity. We as listeners when we listen to the actress Portman in the film Jacki; we get the sense that she imitated Kennedy's voice ideally. However, the measurement of the acoustic parameters, namely, the fundamental frequency, amplitude, intensity, duration, and pitch range, verify that each individual has a unique voice quality that discriminates him/her from others. The study proves its aim by confirming the variance in the acoustic parameters that identify each speaker's voice quality type.

Listeners may fancy while listening to the performed character in the film " Jacki" that the actress perfectly performs Kennedy's appearance and voice. Nevertheless, the study proves the incompatibility of Portman's voice quality with Kennedy's. All the acoustic values indicate that Kennedy's voice quality is breathy, whereas Portman's is a falsetto. Furthermore, to verify more, the researchers analysed an utterance obtained from one of Portman's interviews on youtube and measured the same acoustic parameters to find a similar production value. The study proves that it is impossible to imitate precisely others' voices, and each individual has a unique print voice to identify him/her from others.

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دراسة فيزيائية تحليلية لصوتي جاكلين كنيدي والممثله ناتلي بورتمان في فلم " جاكي"

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الخلاصة

    صفتنا كمستخدمين للغة في عالم اجتماعي ، نتواصل مع أشخاص آخرين عن طريق مشاركة المعلومات في مختلف المستويات. وان كل كلام يتضمن   معلومات لغوية فضلا عن كونه ينقل الكثير من المعلومات حول هوية المتحدث. ويوضح التباين في نوعية الصوت على فهرسة المعلومات حول المتحدث ويبين هوية المتحدث كفرد متميز عن الاخر. تهدف الدراسة الحالية إلى التحقق من صحة الاعتقاد بأن كل فرد لديه بصمة صوتية غير قابلة للتصرف و لا يمكن تقليدها. تتحقق الدراسة من أنه حتى الشخصية الأكثر تشابهًا مع شخصية اخرى ، أو متقاربتين في المكانة الاجتماعية ، فإن ما يحدد الاختلاف بينهما هو نوعية صوت المتحدث. حيث يتم إجراء التحليل الفيزيائي الصوتي عن طريق تحليل المتغيرات الصوتية ، وهي:

التردد الأساسي والسعة والشدة والمدة ونبرة الصوت لجاكلين كينيدي والممثلة ناتالي بورتمان التي أدت شخصية كينيدي في فيلم "جاكي". اوضحت النتائج أن نوعية صوت كينيدي هو صوت هامس. في حين أن نوعية صوت بورتمان هو صوت عالي الطبقه. وخلصت الدراسة إلى أنه من الممكن التعرف على هوية أي فرد من خصائص نوعية صوته نظرًا لوجود بصمة صوتية لكل شخص لا مثيل لها.

الكلمات المفتاحيه: نوعية الصوت ، المتغيرات الفيزيائيه الصوتيه : التردد الاساسي ، سعة الصوت، قوة او كثافة الصوت،المده الزمنيه، نبرة الصوت