Intonation Pattern in Native and Non-native Malayalam Speakers

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ABSTRACT

The aim of the present research was to explore the intonation pattern in native and non-native Malayalam speakers, and the objectives include assessing native and non-native Malayalam speakers, compare the responses in males and females and compare the response across age groups. A total of 40 participants in the age range of 8 30 years old were taken and divided into 2 groups based on males and females. Each group consisted of 20 participants. The participants of group 1 consist of 10 males and 10 females (native speakers) and the participants of group 2 consist of 10 males and 10 females (non-native speakers). They were subjected to sentences written on cards one by one and instructed to produce the sentence. The tasks were visually presented by the examiner at a constant distance of 10 cm away from the participant's eyes, while the participants were required to generate the responses verbally. An acoustical analysis was done using PRAAT software to assess the significance across the age groups. The results revealed that there is reduced mean pitch, reduced pitch range and differences in pitch patterns in non-native speakers compared to native Malayalam speakers.

INTRODUCTION

Speech is a verbal means of communicating or conveying meaning. It consists of both segmental and suprasegmental features. Segmental features are the distinctive units that can be identified, either physically or auditory, in the stream of speech such as consonant and vowels. Suprasegmental features are also called prosodic features, which include intonation, stress and rhythm (Lee & Nusbaum, 1993), which are very important in speech production, perception and in pragmatic meaning at sentence level. Suprasegmental features have an important effect on human intonation. Intonation is defined as "the combination of tonal features into larger structural units associated with the acoustic parameter of voice fundamental frequencies and its distinctive variations in the speech processes" (Botinis et al., 2001). It helps to carry the information in speech which is independent of words and their sounds. Intonation is the speech modulation over time in an utterance. Hence, it is closely related to patterns of timings, loudness and sometimes voice quality. Intonation is an important suprasegmental feature. Intonation is the distinctive use of patterns of pitch or melody. It is the pitch variation and modulations over time in an utterance. Physiologically, intonation is the perception of change in the fundamental frequency of vocal fold vibration (Netsell, 1973). It helps to understand the attitude and emotion of a speaker, understanding the difference between statement, questions and between different types of questions (Munson et al., 2006). Every language has its own and unique intonation system and also certain correlation exists between intonation patterns. The study of bilingualism is the current trend and interesting area among researchers. However, research in suprasegmental features in bilinguals is rare. It is extremely difficult to make meaningful comparisons among the intonation systems of different languages because of the lack of an agreed descriptive framework. Bilingualism is commonly defined as the use of at least two languages by an individual, the use of and proficiency in two languages and exposure to the other users of languages. Bilingualism can be simultaneous or sequential. Simultaneous bilingualism occurs when a young child has exposure to two languages from birth and sequential bilingualism occurs when an individual has had exposure to a second language usually after the age of 3 and after the first language is well established (ASHA, 2004). The changes in vocalization patterns and pitch range indicate the development of intonation in the early stages of life. The changes in fundamental frequency of the child's utterances and increased uniformity in their duration. It was also found that this distinction can be made between unconditional reflex cry and motivated cry in infants (Lewis, 1951; Menyuk, 1971). Sangeetha and Savithri (2012) compared the intonation patterns between Kannada speakers and Manipuri-Kannada bilinguals. The results indicated a decreased f0 range and incorrect f0 contours for sentences in Manipuri-Kannada bilinguals.

Mathew and Bhat (2010) investigated the emotional prosody in Malayalam and Hindi and the results reported that there are differences and similarities in the f0 patterns across the different emotions. Intonation also helps in conveying the attitudes of a speaker such as warning, surprise, boredom and neutrality. It also provides the listener with information about the speaker, including aspects of their identity (gender, age) emotional or affective state (happy, sad or angry) general health and social rules (Munson, 2006). India is a multilingual country where about 255 million and 87.5 million of the population are bilingual and multilingual respectively. Many languages are distinguished, mainly based on

suprasegmental aspects, of which intonation has a key role. It is important to know how a person might depict the intonation of a second language when it is learnt simultaneously or later in life. Researches on intonation in bilinguals are very important to understand and know how a person depicts the intonation of second languages when they are learnt simultaneously or later in life. The present study attempts to explore the features of intonation in non-native Malayalam speakers, who are learning and using Malayalam as their target language.

REVIEW OF LITERATURE

Intonation not only implies a neurophysiological change in vocal fold vibration, but it is also a linguistically based parameter. Many languages use pitch to distinguish words. In languages around the world as diverse as Thai, Hausa (Nigeria), and Mixtec (Mexico), words are distinguished not only by vowels and consonants, but also by the use of a set of distinctive pitch patterns or heights on each syllable. The development of intonation starts in early childhood. It is important to know the physiological and neural control of intonation. Physiologically, there are some differences between adults and infants. In adults, expiration is long whereas in infants it is short. Ribs are angled downwards and outwards from the spine in adults but, in infants, ribs are not angled downwards and outwards from the spine. Adults can regulate sub-glottic air pressure by a hold-back of intercostals muscle gesture. Thus, a steady subglottic air pressure is seen during the non-terminal phase of expiration. Infants can't regulate subglottic air pressure by a hold back intercostals gesture. Therefore, newborn infants can't have steady sub-glottic air pressure by working against the air pressure generated by the elastic recoil of the lungs. Also, the control of sub-glottic air pressure during long expiration requires the elastic recoil pressure of 8-20 cm H2O, which is normally used in speech. After 3 months owing to physiological changes, infants begin to produce long (Lieberman, 1985). episodes of phonation There are some similarities between the adult's intonation patterns and normal newborn cries. Data from several studies indicate that the duration of an expiratory phase in infants is 5 times longer than the duration of an inspiratory phase of adults. The alveolar air pressure function rises rapidly prior to the onset of phonation and then falls rapidly at the end of the phonation. The new born cry pattern intonation is similar to the adult pattern in that the f0 contour tends to be almost level in the non-terminal patterns of breath group. The crying and the gurgling of the first few weeks can be said to be a part of expressive language, which is considered as an expression of the child's state of comfort or discomfort. This may indicate the presence of healthy vocal and articulatory mechanism, while the skills to control over or shape of these sounds are not yet achieved. Bilingualism is the use of two languages by an individual. Simultaneous and sequential bilingualism are the two types of bilingualism. Simultaneous bilingualism occurs when there is a meaningful exposure to two languages from birth. Lewis (1951) attributed a central role for intonation in development of both comprehension and expression in the first 2 years. He observed that infants use intonation effectively to express desire and intentions before they master conventional phonetic forms. The tone of voice involving the pitch direction and range has been known to be present in children from around 2 to 3 months. By 6 months of stage in babbling, the child vocalized tone fully, using single or double syllable (Sheridan, 1968) from 6–8-month, adult like intonation patterns is observed in babbling and limitation as well as in the beginning of jargon. During the third year of life, the child begins to use longer sentences, often described as telegraphic in

nature which includes mainly of content words (nouns, verbs, adjectives) with many function words omitted. Word order is preserved in both imitation of sentence and spontaneous speech. Intonation and stress are used to convey in the meaning. The basic subject-verb-object adverbial constrictions in the clause as well as in the statement, question and command are developed by the end of 3 years old. By 4 years old, the various inflectional endings of words and regulation of tempo, rhythm and pausing is seen and it is close to the adult model. Olney and Scholnick (1976) did a study in pitch patterns in children and reported that pitch patterns detectable in crying and babbling by 6 months are non-linguistic, while during this stage the phonological contrast in children emerges. As the child grows, he or she might learn a second language (L2) along with the native language (L1) or later. The acquisition of L2 can be simultaneous or sequential. The acquisition of intonation of the respective language is also an important factor. Very few studies have been reported on the nature of intonation in late bilinguals. Jenner (1976) compared the intonation among five native English speakers and English of Dutch learners and the study showed that the Dutch learners used a narrower pitch range and replaced the rises with falls. Ueyama and Jun (1998) reported a difference between f0 excursion, duration, intensity between monolinguals and sequential bilinguals. The study tells us that the sequential bilinguals do not necessarily resemble that of monolingual speakers in every single detail. Queen (2001) studied the intonation pattern in Turkish-German bilingual children and the study discussed that bilingual speakers use two distinct rises in both Turkish and German. The results showed that one raise resembles a characteristic German rise, while the other resembles a characteristic Turkish rise. These rising patterns found were non-normative for both Turkish and German. This fusion is proposed to account for the two-way influence between the two languages. Sangeetha and Savithri (2012) studied the intonation patterns between native Kannada speakers and Manipuri-Kannada bilinguals in 4 types of sentences and the recorded sentences were analyzed for intonation contours, tone heights and tone duration using PRAAT software. Results of the study indicated decreased f0 range and incorrect f0 contours for sentences in Manipuri-Kannada bilinguals. There are studies that have not been done on how intonation can vary within a particular language and across languages. One of the studies is done by Garding and Abramson (1965). They sought to find some American English intonation contours that could be identified by native speakers on the basis of fundamental frequency alone. They tried to determine the extent to which the pitch could be given contour before being perceived as different. They repeated each contour with considerable margin within which changes can be made without any effect on perception, as long as these changes do not disturb a certain pattern. Intonation is one parameter of Suprasegmental that gives information on the production aspects of emotions. The intonation in a sentence varies with different emotional states.

Need of the study

It is important to know how a person might depict the intonation of second language when it is learnt simultaneously or later in life. Very few studies have been done on the aspects of intonation in sequential bilinguals in India. It is also essential to know how intonation of non-native speakers of a particular language differs from its native speaker. Hence there is a need for the study to compare the intonation of non-native Malayalam speakers who are studying and using Malayalam as their needed language with native Malayalam speakers.

METHOD

Aim of the study

The aim of the study was to acoustically analyze the intonation pattern of native Malayalam speakers compared with non-native Malayalam speakers.

Participants

Group 1 consists of twenty typical Malayalam speakers further divided into ten males and ten females and Group 2 consisted of twenty non native Malayalam speakers further divided into ten males and ten females.

Inclusion criteria

Participants in the age range of 18-30 years. Group 1 consisted of Native Malayalam speakers. and Group 2 consisted of Non-native Malayalam speakers with the 2 to 6 years of exposure to Malayalam language.

Exclusion criteria

Subjects with voice abnormality with speech and language disorders and neurological problem and hearing loss are excluded.

Stimuli

Exclamatory, Interrogative, Imperative and Declarative Malayalam sentences were selected from "Grammar book of Malayalam". (Nair, 2008)

Procedure

The recording was done in a sound treated, well illustrated room. The participants were seated on a comfortably and the microphone was placed at a constant distance of 10 cm away from their eyes. The participants were visually presented with the sentences written on cards one by one and instructed to say the sentences. Three recordings of each sentence were made.

ANALYSIS

The acoustical analysis was done using PRAAT software (version 5.2.35) by Boersma and Weenink (2015). Maximum and minimum pitch values of each sentence were noted to find the range. The mean pitch value of whole sentences was noted. The jitter value of each of the sentences was taken to check the pitch perturbation throughout the sentences. The pitch pattern of each sentence was subjectively analyzed. The obtained data was further analyzed statistically for significant differences.

RESULTS

This study aims to acoustically analyze the intonation patterns of native Malayalam speakers comparing with non-native Malayalam speakers (see ANNEX)

DISCUSSION

The mean pitch showed high significant differences between native and non-native speakers for declarative, exclamatory, imperative and interrogative sentences across males and females. Mean pitch values showed greater significance for native female speakers than non-native female speakers. The same result was not seen for male participants. The mean pitch values were greater for non-native males than native males. The Jitter values of each sentence were considered and there was greater Jitter value for non-native speakers for all four types of sentences. This was thought to be as a result for exaggeration of intonation in non-native speakers in order to match the native pattern. A study was done by Kraayeveld (1997) on

jitter values of spontaneous speech and reading showed that spontaneous speech considered greater jitter values. The overall result indicated reduced mean pitch, reduced pitch range and differences in pitch patterns in non-native speakers compared to native Malayalam speakers. This study was published recently in accordance with the study done by Sangeetha and Savithri (2012) when reduced pitch range and different patterns were found for Manipuri-Kannada compared to native Kannada speakers. speakers The sample size in the present study was small and the age range was limited. The study hasn't included the perceptual and spectrographic analysis and duration and intensity were not considered. Hence it is recommended that study can be replicated on a greater number of subjects. Perceptual and Spectrographic evaluation can be included and comparative study can be done in other Indian Languages. The comparison of intonation can be done among different emotions and languages. Stress, Intensity, Duration can be included.

CONCLUSION

The present study aimed to acoustically analyze the intonation pattern of native Malayalam speakers compared with non-native Malayalam speakers. The participants in group 1 consists of twenty typical Malayalam speakers further divided into ten males and ten females and Group 2 consisted of twenty non-native Malayalam speakers further divided into ten males and ten females. Participants in the age range of 18-30 years. Group 1 consisted of Native Malayalam speakers. and Group 2 consisted of Non-native Malayalam speakers with the 2 to 6 years of exposure to Malayalam language were included for the present study whereas participants with voice abnormality with speech and language disorders and neurological problem and hearing loss were excluded. Exclamatory, Imperative Interrogative, and Declarative Malayalam sentences were selected from "Grammar book of Malayalam". (Nair, 2008) and used as stimuli in the present study. The participants were visually presented with the sentences written on cards one by one and instructed to say the sentences. Three recordings of each sentence were made. The pitch pattern of each sentence was subjectively analyzed. The obtained data was further analyzed statistically for significant differences. Mean pitch showed high significant differences between native and non-native speakers for declarative, exclamatory, imperative and interrogative sentences across males and females. Mean pitch values showed greater significance for native female speakers than non-native female speakers. The same result was not seen for male participants. The mean pitch values were greater for non-native males than native males. The Jitter values of each sentence were considered and there was greater Jitter value for non-native speakers for all four types of sentences. This was thought to be as a result for exaggeration of intonation in non-native speakers in order to match the native pattern. A study was done by Kraayeveld (1997) on jitter values of spontaneous speech and reading showed that spontaneous speech considered greater jitter values. The overall result indicated reduced mean pitch, reduced pitch range and differences in pitch patterns in non-native speakers compared to native Malayalam speakers. This study was published recently in accordance with the study done by Sangeetha and Savithri (2012) when reduced pitch range and different patterns were found for Manipuri-Kannada compared to native Kannada speakers.

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APPENDIX

Declarative:/ s Ku: Innu Ourei kkum / (School will be opened today)

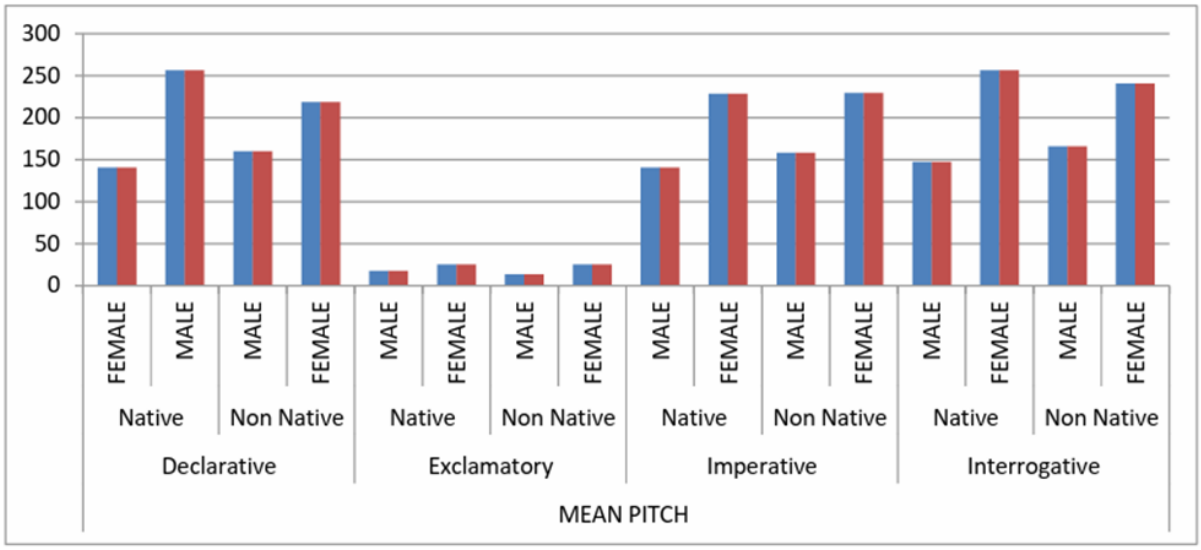
Exclamatory:/ hai jenOu:nalapu:ve/ (Hi! What a beautiful flower)

Imperative:/ ni:nei ku: pc u ka :aem/ (You may go)

Interrogative:/ ni nnjiInnu sku:Ii l pc jc / (Have you gone to school today?)

ANNEX

Figure 1. *Showing the mean scores of mean pitches among four types of sentences for native and non native speakers*



The above figure shows that the mean pitch values were high for all four types of sentences in non-native male compared to native male. The mean pitch values were high for three types sentences, in native female compared to non-native female except imperative sentences.

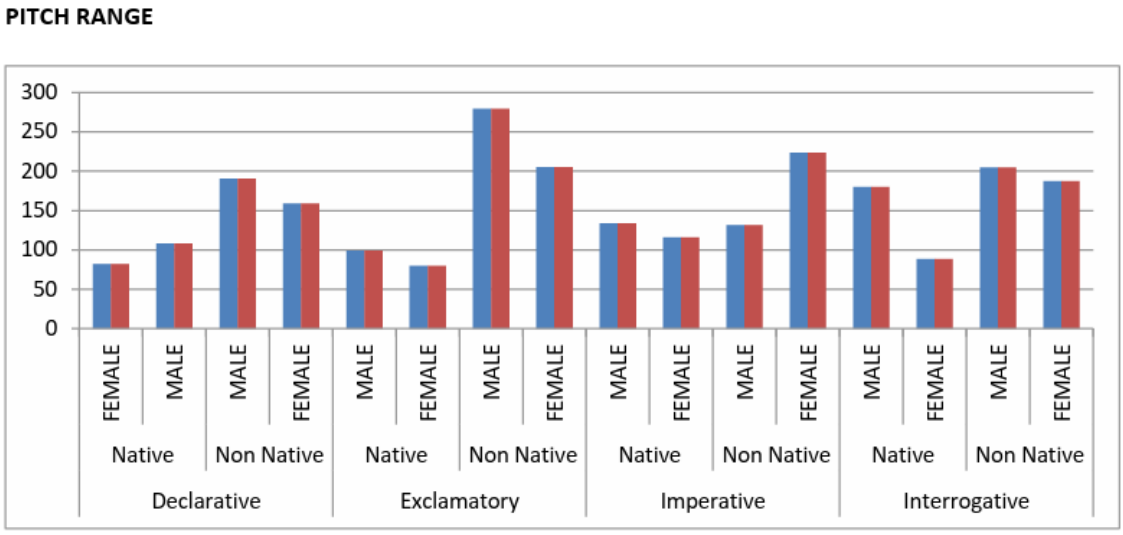
Table 1. *Showing the Mean pitch of native and non-native participants for Declarative, Exclamatory, Imperative, Interrogative sentences*

Parameters	GROUP	GENDER	N	MEAN	STANDARD DEVIATION	t' value	p' value	Significance
Declarative	Native	MALE	10	140.3	10.12	14.87	0.000	HS
		FEMALE	10	256.22	22.48			
	Non Native	MALE	10	159.9	12.88	6.7	0.000	HS
		FEMALE	10	218.42	24.42			
Exclamatory	Native	MALE	10	17.33	17.33	12.21	0.000	HS
		FEMALE	10	25.29	25.29			
	Non Native	MALE	10	13.57	13.57	8.08	0.000	HS
		FEMALE	10	25.33	25.33			
Imperative	Native	MALE	10	140.44	28.42	4.59	0.000	HS
		FEMALE	10	228.3	52.4			
	Non Native	MALE	10	158.11	20.01	6.59	0.000	HS
		FEMALE	10	229.26	26.61			
Interrogative	Native	MALE	10	147.21	19.4	13.22	0.000	HS
		FEMALE	10	256.37	20.56			
	Non Native	MALE	10	165.57	15.47	8.06	0.000	HS
		FEMALE	10	240.38	24.93			

HS-Highly Significant

The above table showed high significant differences between native and non-native speakers for declarative, exclamatory, imperative and interrogative sentences across male and females. (p=0.000)

Figure 2. *Showing the mean scores of Pitch range among for Declarative, Exclamatory, Imperative, Interrogative sentences for native and non-native speakers*



The above figure indicates the mean pitch range was reduced for non-native speakers except imperative and declarative sentences.

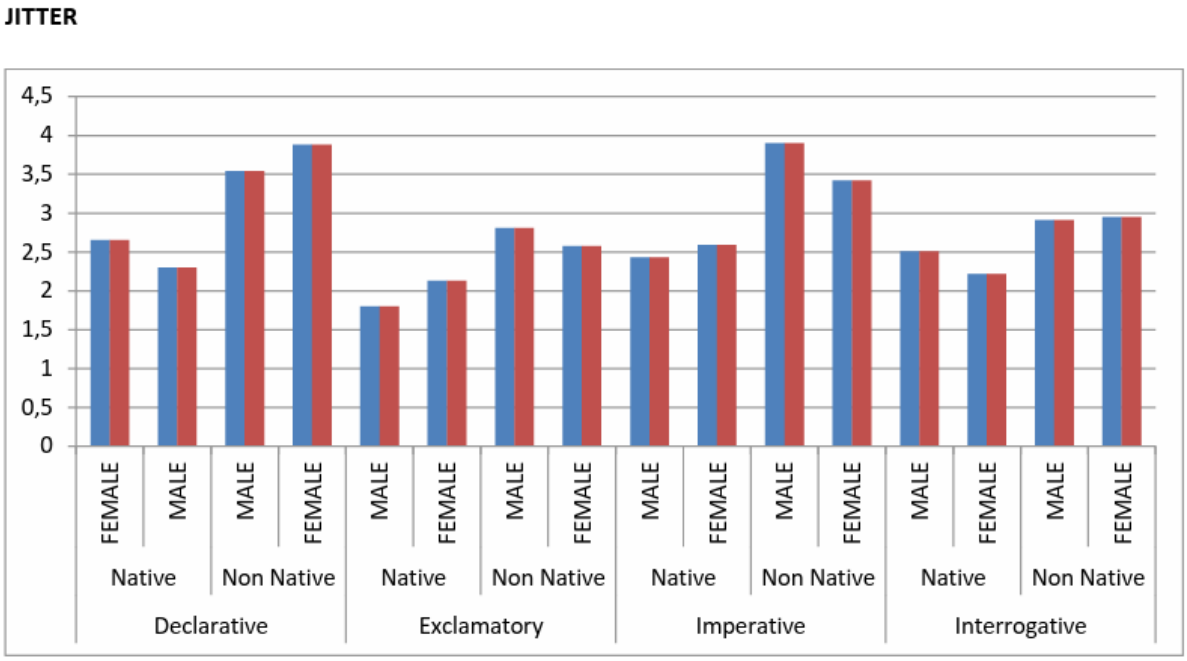
Table 2. *Showing the pitch range of native and non-native participants Declarative, Exclamatory, Imperative, Interrogative sentences*

Parameters	GROUP	GENDER	N	MEAN	STANDARD DEVIATION	t' value	p' value	Significance
Declarative	Native	FEMALE	10	82.05	17.85	1.61	0.125	NS
		MALE	10	108.23	48.31			
	Non Native	FEMALE	10	190.32	36.01	1.71	0.104	NS
		MALE	10	158.97	45.42			
Exclamatory	Native	FEMALE	10	98.96	59.17	0.68	0.506	NS
		MALE	10	79.96	65.78			
	Non Native	FEMALE	10	279.14	57.18	3.31	0.004	HS
		MALE	10	205.26	41.22			
Imperative	Native	FEMALE	10	133.99	112.17	0.36	0.724	NS
		MALE	10	116.14	103.19			
	Non Native	FEMALE	10	131.53	73.76	2.84	0.011	
		MALE	10	223.38	70.81		0.594	Sig
Interrogative	Native	FEMALE	10	179.8	138.79	2.03		NS
		MALE	10	88.21	30.64			
	Non Native	FEMALE	10	204.37	68.75	0.54		NS
		MALE	10	187.48	70.58			

NS- Not Significant, HS- Highly Significant

From the above table, it can be noted that significant differences were noted for exclamatory (p=0.004) and imperative (p=0.011). When compared with males and females for non-native speakers. No significant differences were found for Declarative, Interrogative, Exclamatory native male and female, Imperative native male and female.

Figure3. *Showing the pitch range of native and non-native participants for four types of sentences*



The above figure shows that jitter values were high for non-native speakers for all four types of sentences across male and female.

Table3. *Showing the mean values of Jitter among four types of sentences for native and non-native participants*

Parameters	GROUP	GENDER	N	MEAN	STANDARD DEVIATION	t' value	p' value	Significance
Declarative	Native	FEMALE	10	2.65	0.77	1.53	0.142	NS
		MALE	10	2.3	0.27			
	Non-Native	FEMALE	10	3.54	0.8	0.9	0.381	NS
		MALE	10	3.88	0.91			
Exclamatory	Native	FEMALE	10	1.8	0.53	0.151	0.148	NS
		MALE	10	2.13	0.41			
	Non-Native	FEMALE	10	2.81	0.66	0.72	0.479	NS
		MALE	10	2.58	0.74			
Imperative	Native	FEMALE	10	2.43	0.67	0.56	0.582	NS
		MALE	10	2.59	0.6			
	Non-Native	FEMALE	10	3.9	0.99	1.19	0.251	NS
		MALE	10	3.42	0.77			
Interrogative	Native	FEMALE	10	2.51	0.98	0.73	0.477	NS
		MALE	10	2.22	0.78			
	Non-Native	FEMALE	10	2.91	0.36	0.11	0.91	NS
		MALE	10	2.95	0.84			

NS- Not Significant

The above table showed no significant difference for native and non-native speakers across male and female.