

**A COMPARATIVE STUDY OF INTONATION IN YES-NO
QUESTIONS ACROSS TWO KANNADA DIALECTS**

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Register No.: 11SLP014

A Dissertation Submitted in Part Fulfillment for the Degree of
Master of Science (Speech - Language Pathology),
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**ALL INDIA INSTITUTE OF SPEECH AND HEARING
MANASAGANGOTHRI
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May, 2013**

Dedicated to

My Mother, Father and My Guide

Certificate

This is to certify that this dissertation entitled “**A Comparative Study of Intonation in Yes-No Questions across Two Kannada Dialects**” is a bonafide work in part fulfillment for the degree of Master of Science (Speech-Language Pathology) of the student (Registration No. 11SLP014). This has been carried out under the guidance of a faculty of this institute and has not been submitted earlier to any other University for the award of any other Diploma or Degree.

Mysore

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Declaration

This dissertation entitled “**A Comparative Study of Intonation in Yes-No Questions across Two Kannada Dialects**” is the result of my own study under the guidance of Prof. R. Manjula, Professor of Speech Pathology, Department of Speech-Language Pathology All India Institute of Speech and Hearing, Mysore, and has not been submitted earlier in any other University for the award of any Diploma or Degree.

Mysore

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A candle loses nothing by lighting another candle

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Father James Keller

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INTRODUCTION

The features of speech can be broadly classified as ‘segmental’ and ‘suprasegmental’. The basic constituents of speech elements are referred to as segmental features and the other features which aid in expressing the segmental features are referred to as suprasegmental features. The suprasegmental features include variations in loudness, pitch, duration and changes in voice quality (Cruttenden, 1997).

Intonation is a prosodic feature, which includes differential variations in pitch (Cruttenden, 1997). The intonation of any given sound string would be measured in terms of a) pitch pattern (i.e. recurring configuration of consecutive pitch heights) b) pitch range (i.e. the distance between the highest and lowest pitch heights) and c) pitch register (i.e. the general pitch level of a section of speech) along with other set of parameters such as stress, volume, tempo, voice quality and pause (Varga, 2002).

The functions of intonation are classified in many ways, like for example, ‘grammatical’ and ‘functional’, (Crystal, 1969) or as ‘grammatical’ and ‘attitudinal’ (Varga, 2002). The ‘attitudinal intonation’, refers to the means of expressing speaker’s attitude(s) while the ‘grammatical intonation’ highlights those features that aid the syntactic constituents of utterances or aid to disambiguate sentences which are ambiguous in terms of cognitive meaning, thematic meaning or communication sentence type (Varga, 2002). These functions are not mutual by exclusion.

In every language, the use of pitch fluctuations become semi-standardized or formalised, so that all speakers of the language use basic pitch sequences in similar

ways under similar circumstances. These abstracted characteristic sentence melodies are called *intonation contours* (Crystal, 1969). Thus, when pitch patterns are used for distinguishing utterances, they can be called intonation contours (Varga, 2002). The intonation contours are language specific, i.e., they vary with the structure of the language (Bolinger, 1972). The intonation of a language contributes to a system of distinctive units and patterns (Crystal, 1969).

Kannada is one of the major Dravidian Languages of South India spoken in the state of Karnataka. Although the ‘Formal’ or ‘Standard’ variety of Kannada is considered to be of Mysore- Bangalore (now Mysooru – Bengalooru) dialect, there are at least seven clearly identifiable dialects or regional variations of Kannada reported by authors (Rajapurohit, 1982; Sridhar, 2007). These include Mysooru Kannada, Dharwada Kannada, Mangalooru Kannada, Gulbarga Kannada, Karwar Kannada, Mercara Kannada and Chitradurga Kannada. However, the dialects of Mysooru, Dharwada, Mangalooru and Gulbarga are considered to be the major dialects of Kannada (Rajapurohit, 1982; Sridhar, 2007; Upadhyaya, 1976).

The Mysooru Kannada (commonly known as Mysore-Bangalore dialect) which is considered as the ‘Standard variety’ of Kannada (Rajapurohit, 1982; Sridhar, 2007) is spoken majorly in southern Karnataka in the districts of Mysooru, Bengalooru, Kolar, Hassan and Mandya. The Mangalooru Kannada is spoken majorly in the districts of Mangalore, Udupi and other coastal areas of Karnataka. The Dharwada Kannada is spoken majorly in the districts of Dharwad, Belgaum and Bijapur (North Western Karnataka). The Gulbarga Kannada is spoken in the districts of Bellary, Raichur, Gulbarga, Bidar and other northern districts of the Karnataka state (Rajapurohit, 1982; Sridhar, 2007). These dialects vary significantly in their

segmental aspects in terms of the vocabulary, phonology and other morpho- syntactic structures (Upadhyaya, 1976).

The variations of intonation in Kannada have been studied majorly in Mysooru-Bengalooru Dialect (Manjula, 1997; Patil, 2007; Suma, 2007; Vandana, 1999). Manjula (1979) and Nataraj (1981) found that in Kannada language, sentences are expressed with a final fall except for those with emotions like fear and anger, wherein a final-rise is noticed. Based on objective analysis, Manjula (1997) reported a general rise in F0 for Yes/No questions and fall for Wh-questions for Mysooru-Bengalooru dialect of Kannada. Different patterns of declination and inclination were also observed. Patil (1986) studied Dharwada dialect using a perceptual method and observed that the Yes/No questions have a rising pitch at the end. Further, studies have also reported that the rise in terminal F0 contour is distinct in Yes/No questions in standard Kannada (Nataraj, 1981; Manjula, 1997; Patil, 2007; Suma, 2007; Vandana, 1999).

Need for the study

The dialects of Kannada have been studied for their vocabulary, phonological and morpho-syntactic variations extensively (Upadhyaya, 1976). The ‘standard’ variety of the written language is considered to be the Mysooru-Bengalooru Kannada (Sridhar, 2007) and majority of the studies on suprasegmental features have been carried out in this dialect. Only one study reported the intonation patterns of Dharwada Kannada in Yes-No question based on a small corpus (Patil, 1986). Though, studies in the description of the intonation patterns of Mysooru- Bengalooru variety which is also considered the standard variety of Kannada, are available (Nataraj, 1981; Manjula, 1997; Patil, 2007; Suma, 2007; Vandana, 1999), no study

has been reported on the prosodic features of the other dialects of Kannada using objective procedures. Since, Kannada is spoken in a large geographic area having many regional variations/ dialects varying significantly in terms of segment features like vocabulary, syntax, morphology and phonology (Upadhyaya, 1976), it would be interesting to understand the variation in suprasegmentals (especially intonation) if any across the dialects of Kannada. No study has addressed the variations if any in the suprasegmental features of different dialects in Kannada. Research in this area will yield information in the regional/dialectical variations in intonation, which will help further in assessment and management of intonational errors in the individuals with communication disorders. This study focuses on analysis and comparison of intonation in selected Yes/No questions elicited from native speakers of the two dialects of Kannada, viz. Mangalooru and Dharwada.

Aims and Objectives

The study aims to analyse and compare selected features of intonation in the Yes-No questions uttered by adult native speakers of Dharwada and Mangalooru dialects of Kannada language.

The specific objectives of the study are to carry out the following:

1. *Perceptual analysis* of selected Yes-No questions uttered by the adult native speakers of Dharwada and Mangalooru dialect of Kannada language by trained judges to determine:
 - a) The utterances that shared common syntactic structure and frame from amongst the corpus recorded

b) The nucleus (primary stress) on syllables in each of the Yes-No utterance of the Intonation group/s of each speaker.

2. *Acoustic analysis* and comparison of selected Yes-No questions uttered by the adult native speakers of Dharwada and Mangalooru dialect of Kannada language to extract the following features of intonation:

a) Intonation Contours as a whole for contour shape, range, intonation groups and terminal contour.

b) Features of the nucleus (Primary and Secondary stress):

- F0, intensity and duration of the nuclear syllabus/bi (Primary and Secondary stress)
- Occurrence of peak F0 in the intonation group/s of the contour on nucleus/i or non-nucleus/i segment of the utterance.

c) F0 features:

- F0 range in the utterances.
- Declination/Inclination/Up-Step/ Down-Step of the Intonation groups/ contours.
- F0 gradient (Hz/sec) from initial to final syllable of the Intonation group/ contour
- F0 gradient (Hz/sec) of terminal word and terminal syllable in the intonation contour.

d) Temporal features

- Duration of Intonation Contour
- Duration of the Terminal word
- Duration of the Terminal syllable

Implication of the Study

The results obtained in the present study will help in:

- Providing insight into variations of intonation patterns in the Kannada dialects Mangalooru Kannada and Dharwada Kannada.
- Developing individualised assessment tools and rehabilitative protocols for the individuals hailing from different parts of Karnataka.

REVIEW OF LITERATURE

Prosody is a well-recognised and essential feature of speech process in real time (Vion & Colas, 2006). The parameters of prosody include intonation, stress, rate, rhythm, pause etc. (Lowit & Kuschmann, 2012). Amongst the prosodic features, intonation is said to carry universal or near universal features. The prosodic parameters such as rate, pause and stress have been studied extensively as early as 1960s (e.g., Canter, 1963) but information on specific features of intonation is relatively limited (Lowit, & Kuschmann, 2012).

Intonation or the pitch variations which occur in a language are not haphazard, but follow certain rules, and are highly organised. Though, a speaker can make such variations with relatively less effort, analysing these variations is often difficult, because intonational meaning is super imposed on the lexical meanings (Pike, 1945).

The intonation of English language is described in 2 ways: (i) The Level approach and (ii) The Contour approach. The *Level approach* proposed by Pike (1945) regards *relative height of the pitch* as phonemic. It means that the relationship shared by the intonation configurations is similar to the relationship shared by vowel and consonant to a word in a language. The essential part of level analysis is the succession of levels. In this approach, the intonation of English is distinguished based on four relative pitch levels (Pike, 1945). These pitch levels are relative and are dependent on the height between each other and the distances between them may not be uniform. These pitch levels are named as *extra-high*, *high*, *mid* and *low* and are numbered from one to four, where one indicates 'extra-high' (Bolinger, 1972). On the other hand, in the *Contour approach*, the syllable having the primary accent is

identified as ‘nucleus’ and the utterances are distinguished as ‘intonation groups’ each marked by a ‘Head’, a ‘Nucleus’ and a ‘Tail’. The ‘Head’ and the ‘Tail’ may not necessarily occur in an intonation group (Fox, 2000). In Contour approach, stress is regarded as being ‘independent but yet interacting with the contour’ (Bolinger, 1972). A distinctive pitch pattern that continues to the end of the intonation group is called a *nuclear tone* (Vanderslice & Ladefoged, 1972) or ‘nucleus’ (Cruttenden, 1997). There is often only one nucleus to an intonation group and it has the most prominent pitch accent. The segment of speech which precedes the nucleus is termed as ‘pre-nuclear tone’ and the relationship between the pre-nucleus and the nucleus is like that of a stem morph and a prefix i.e. like a prefix modifying the core meaning of the stem (Cruttenden, 1997). *In the present study, the analysis of the intonation is based on the Contour approach.*

Intonation contours help to phonetically mark the sentence boundaries or clauses. These segments are referred to as breath groups, information units, intonation phrases (Snow, 1998) and sense groups (Cruttenden, 1997). Cruttenden (1986), describes the tonal characteristics of the prosodic units ‘Intonation groups’.

The functions of intonation may be grouped into four: grammatical, affective, interaction and pragmatics (Couper-Kuhlen, 1986 *as cited in* Wells, & Peppé, 2003).

a. Grammatical intonation

According to Bolinger (1958d, p.37 *as cited in* Crystal, 1969), ‘the encounters between intonation and grammar are casual, not causal’; while Halliday (1964) (*as cited in* Crystal, 1969) states that the interactions are more ‘central’. Crystal (1969) further states that the given grammatical structure has good correlation

with the given intonational pattern and change in intonation can lead to different structural description of an utterance and no other morphological change would be necessary. The grammatical role of intonation was addressed by various other studies too, which point to the common notion that the grammatical role of intonation is limited (Halliday, 1967; Couper-Kuhlen & Selting, 1996) and the controversies continue to revolve around the notion that some intonational functions thought to be grammatical are more of interactional or pragmatic (Couper-Kuhlen & Selting, 1996).

b. Affective Intonation

Intonation allows the speaker to convey his/ her emotions and attitude (Cruttenden, 1997). Emotions like anger, sadness, happy, sarcasm, exclamation are expressed through intonation. In Kannada language, Manjula, (1997) studied 9 emotions in 36 sentences and found that “emotions are expressed with a final fall in the intonation pattern and a single type of emotion can be expressed with different intonation patterns” while, Nandini (1985), found that in Kannada language, the emotions expressed with either a steep or a gradual final fall in intonation patterns are neutral, jealousy, hesitation and request. Nandini (1985), also found that sentences conveying anger, frustration were expressed with a final rise.

c. Interactional Intonation

During conversational interactions, subtle ways of using intonation are observed like for example, changes in intonation can mark the end of conversational turn (Wells & Peppé, 2003).

d. *Pragmatic intonation:*

Both interactional and pragmatic intonations are closely related to each other (Couper-Kuhlen & Selting, 1996). Intonation is used to direct a listener's attention to an important word/idea. That is, intonation helps in focussing the attention of a speaker (Halliday, 1967).

Example 1: /pennU mət̪t̪e pepərU/ v/s /pennU mət̪t̪e pepərU /

(In the above example, the underscored words indicate the locus of the main pitch accent or nuclear tone). The focus of the listener is directed to the under scored word by changing the focus of intonation (nuclear tone).

On similar lines, Bolinger, (1972) describes intonation essentially in two ways: *atomistic* and *global*. The *atomistic* approach is studying the meaningless subunits of intonation (like phonemes). The *global* approach is also called as 'tune approach' or 'contour analysis'. It describes the whole contour explaining the grammatical or attitudinal meaning of the speaker.

Pike (1945) described the characteristics of intonation in two ways:

- a. The contours which are completely colourless in meaning, also called as 'international minimum of speech' which serves as a mould in forming other sentences.
- b. The intonation which is formed due to the speaker's attitude and physiological state like happiness, anger, age, gender etc.

Pike (1945) further states that one sentence might be produced with different intonation contours and one intonation contour might have many individual meaningful parts.

Irrespective of the differences in function and segmental features of intonation, many languages are also reported to share some common features and thus referred to as sharing ‘universal’ feature of intonation. Bolinger (1972) states that there are three features of intonation, which tend to have similar uses in all languages:

- a. *Range*: It conveys emotion and is not in voluntary control. When excited, the tone tends to be rising and when depressed, it tends to be monotonous.
- b. *Direction*: Direction along with pause helps in marking the sentences. In a polar question (Yes/No) the direction tends to be rising.
- c. *Relative height*: This is related to the importance given to a particular word or words in a sentence.

Four Indian languages viz. Kannada, Tamil, Gujarati and Hindi were studied under five emotional conditions (anger, sad, joy, jealousy and neutral) by Nataraj (1982). He found that there was similar intonation patterns seen across the languages and similar intonation pattern were observed for same emotions, suggesting a ‘universal’ pattern of intonation present in these languages.

Intonation in Questions

Question Intonation in Non- Indian languages

In English, rising terminal contour indicates questions, while a falling terminal contour depicts statements (Cruttenden, 1997). Perception of intonation using synthesized speech suggested that the ‘turning point’ (final shift of F0 before the termination of the sentence) and the slope of phrase- final segment helped in the perception of questions while the medial and initial segments had little role in the judgement of the question (Hadding-Koch & Studdert-Kennedy, 1964; Majewski & Blasdell, 1968). Pike (1945) opines that there is no fixed intonation curve for questions, and the specific patterns depend not on the sentence type but on the attitude

of the speaker and the questions beginning with interrogative pronouns generally have a falling contour.

In French, the interrogatives which contain more than two stress groups are produced with a final rise preceded by sequences of lowered pitches (Vion & Colas, 2006). An earlier study in French interrogatives by Delattre (1967) found that the questions in French have a rising curve. The short interrogatives in Italian have either falling or falling-rising intonation patterns (Chapallaz, 1964). In Japanese Wh questions, a gradual falling intonation pattern was observed (Abe, 1955).

Yes/No questions have rigid intonation pattern as compared to other types of interrogatives (Magdics, 1963). Bolinger (1978) (*cited in* Cruttenden, 1997) surveyed 36 non-tonal languages and reported that in 32 of the languages, interrogatives generally had a rising pattern and in Yes/No questions, both rising and falling patterns were observed depending on the attitude or emotion of the speaker. In the tone languages also, a terminal rise was observed for Yes/No questions (Cruttenden, 1997; Miller & Tench, 1981). Abe (1955) noted that a sentence can be made in to a Yes/No question by concluding the sentence with a rising intonation pattern. Chapallaz (1964) observed that in Italian, the Yes/No questions had a Falling-rising pattern.

In English, Snow (1998) stated that the intonation contour of a Yes/No question would be a rising pattern (Example 2).

Example.2: Did the cat go home?

The final word 'home' is typically represented generatively by the pitch sequence, L*H-H%. The beginning of the sentence is low pitch accent (L*) and

ending phrase accent (H-) and a high boundary tone (H%). Pike (1945) observed rising intonation contour for Yes/No questions in American English.

Question Intonation in Indian languages

ShankaraBhatta (1978) classifies the interrogatives in Kannada into four groups: /Vaicaarika/ /prashnegaLu/ or *Question word questions*; /tathyaviSayaka/ /prashnegaLu/ or *Yes-No questions*; /vaikalpika/ /prashnegaLu/ or *Alternate questions*; and /anugata/ /prashnegaLu/ or *Echo questions*

- a. /Vaicaarika/ /prashnegaLu/ or *Question word questions*: These questions are used to seek an answer with reference to a person, event, thing etc. The Wh-questions in Kannada language starts generally with e-, ee- or yaa- . Example, ‘eenu’ – what; ‘elli’ – where ; ‘yaaru’ – who (Schiffman, 1979).
- b. /tathyaviSayaka/ /prashnegaLu/ or *Yes-No questions*: The Y-N questions have either an affirmative ‘yes’ or a negative ‘no’ as the response. In Kannada, the Y-N generally contains long vowels ‘ee’, ‘aa’, ‘oo’ at the end (Shankara Bhatta, 1978). Schiffman observes that in Kannada, any statement can be converted to a Y-N question by adding long vowel –‘aa’ at the end. Sridhara (1990) distinguished two types of Y-N questions. These include:
 - *Neutral Y-N questions*: Here, the speaker doesn’t expect a particular type of answer .i.e. yes/no. These types of sentences are formed in two ways: first by adding clitic –‘aa’ (dialectically ‘-ee’ or ‘-oo’) at the end of the sentences and secondly by cliticizing question word ‘-eenu’ (what) at the end of the sentences. Also, these clitics change with the gender of the addressee and the relationship between the speaker and the addressee i.e. in case of casual relationships, clitic ‘–oo’ is used when the addressee is a

male a while clitic ‘-ee’ is used when the addressee is a female and in case of polite relationship ‘-ri’ or ‘-ra’ is used (Sridhara, 1990).

- *Leading Y-N questions:* These questions expect an affirmative answer and are formed by adding ‘alla/illa’ (dialectal variants like ‘allava/illava’; ‘allave/illave’; ‘allavo/illavo’) at the end. The syllables ‘alla/illa’ are negative elements and are used by adding clitic ‘-aa’ or ‘-ee’ and raelly ‘-oo’ or ‘-taane’ (‘-taane’ conveys a stronger positive expectations (Sridhara, 1990).

c. /vaikalpika/ /prashnegaLu/ or *Alternate questions:*

The answer to these types of questions would be among the two or three choices provided by the speaker .i.e. the addressee has to choose from the alternatives provided by the speaker.

d. /anugata/ /prashnegaLu/ or *Echo questions:*

The speaker indicates his or her opinion in the form of a question (ShankaraBhatta, 1978). In Kannada it is indicated by adding the words ‘houdalvaa’ or ‘alvaa’ (Is it not?) or /houdaa/ (Is it?).

Natanasabapathy, (1986) studied intonation in Tamil and found that the non-polar interrogatives had a rise-fall type of intonation contour and Yes-No questions have a terminal rise intonation pattern (Natanasabapathy, 1986). Manjula (1997), studied interrogatives in Mysore dialect of Kannada and concluded that, in a terminal word, the F0 is higher in the terminal syllable than in the whole word. It was observed that the Yes/No questions had higher terminal rise. In the durational aspects, the terminal words were longer than the initial words and that the terminal syllable in the terminal word was longer than the rest of the syllables in that word. Thus, it was concluded that both pitch and duration play a major role in the perception of Yes/No

questions. Nandini, (1985) studied 30 sentences in Kannada using the audio tape recordings from three Kannada movies and found that the different intonation contours were present for different sentence types (e.g. neutral sentences and sentences depicting – surprise, anger, questions, hesitations, jealousy etc.). The terminal contours were different and prominent in determining these emotions. Five questions were studied and found that four out of five questions had “R-F-F-F-R” intonation curve and all the contours showed a rising pattern and a decreased intensity at the termination of the final word. Suma (2007), found that the loci of F0 to distinguish a statement from Yes/No questions may not be terminal syllable itself but the loci could have spread over the entire terminal word. These conclusions were drawn from the results of a perceptual study carried out using synthetic tokens (30 listeners) to study the perception of intonation contours in Yes/No questions. It was observed that acoustic changes in F0 and duration on the terminal word may be the key factor which distinguishes Yes/No questions from statements perceptually. It was also noted that steep rise in the F0 cued perception of Yes/No questions better than the shallow rise, thus a combination of pitch and duration were essential in perceiving Yes/No questions in Mysore Kannada.

Role of Stress in Intonation

Different terms are used to indicate stress viz. accent, emphasis and prominence. These are considered to be synonyms by few others (Cruttenden, 1997) while few treat them as separate entities (Crystal, 1969). Stress is considered to be an articulatory gesture depicting the muscular effort, while prominence involves the combination of stress, duration and intonation. Pike, (1945) considers stress to be a superimposed factor that is used to indicate emphasis or exclamation. When in an utterance, if a word or group of words carry more information than the other

segments, then it is termed as *relative emphasis* (Crystal, 1969). In a given context, the primary accent would be placed on the most prominent/ emphasized syllable and the remaining syllables would have different degrees of accent relative to the primary stress. The prominent feature of stress is loudness and that of accent is pitch (Crystal, 1969). In a word, stress is present at varying degrees in certain positions. In, Czech and Finnish languages, stress are seen on the initial syllable. In Spanish and Welsh, stress is on the penultimate syllable while in Spanish and Turkish it is seen on the final syllable (Cruttenden, 1997).

In English, the sentence which occurs at the final position of the sentences is generally termed as *primary contour* (Pike, 1945). These primary contours begin with stressed syllable and any heavily stressed syllable will be the starting point of a new contour.

Example 3: He's coming today.

⁰2- -4

The stress is on the word 'coming' marked by (⁰). Thus, the stressed syllable marks the beginning of the primary contour (Pike, 1945).

Ladd (1983) opines that for studying the pitch contours it is necessary to decide the nature of stress since intonation involves the interaction of pitch and prominence. In the 'level' analysis or the American analysis system, the stress is considered to be in another 'level' and the perceived stress on the sentence is considered to be on the greatest pitch prominence of the intonation contour. Typically in the British system of analysis, stress is called as the 'nucleus'. Acoustically stress is determined by the fundamental frequency, duration, intensity and phonetic quality of the syllables (Brown & McGlone, 1974).

Declination in Intonation Contours

Declination is a phenomenon of declining pitch from initial to final position (Cruttenden, 1997). It is believed that declination operates at both the pitch ends. Declination occurs due to the fact that the unaccented syllables at the sentence initial position are at higher pitch than the unaccented syllables at the sentence final position. A series of high peaks having equal prominence tend to decline in absolute pitch. This is called as “Top line declination” (Cruttenden, 1997). Declination of pitch is present both at the level of intonation groups and at sentence level. It is also observed that peaks at sentence final positions are lower than that of the preceding peaks (Cruttenden, 1997).

Intonation and Gender

The prosodic variations across genders has not been studied in Kannada dialects. In a study across Southern British English and Southern California English by Barry (2007) (*cited in* Clopper & Smiljanic, 2011), it was found that the females produced more high-rising terminals (HRT) (i.e. rising intonation at the end of the sentences) and exhibited a larger pitch ranges than males in HRTs. Similar findings were reported in Australian English (Britain, 1992). Also, the frequency of occurrence of HRTs in Australian English was observed to be more in Females (Warren, 2005b). Daly and Warren (2001) reported that the gender differences for pitch range variability were higher for story reading task as against sentence reading. They concluded that these differences were due to differences in the approach to the task (viz. attitude, emotion etc.) between males and females. Thus, one can expect that gender plays a vital part in the differences in the way the prosodic aspects are coded.

Clopper and Smiljanic (2011) studied Midland and Southern variety of American English for speaking rate variations and pitch movements using passage reading task across five males and five females each in both dialects and found significant differences across dialects and gender in prosodic aspects like pause distribution, pitch accents and F0 variations for phrase-boundary tone combinations.

Intonation and Dialect

The studies on prosodic variability in different languages like English, Danish, Dutch, German, Irish, Italian, Portuguese, Spanish, Serbian and Swedish have shown that the dialects vary in prosodic features like “rhythm, type and frequency of occurrence of tonal categories, their phonetic implementation and their combination into phrase- level tunes, as well as interpretation of those tunes” (Clopper & Smiljanic 2011). The differences between the dialects can be as large as two unrelated languages or there could be very subtle phonetic differences. The prosodic features contribute greatly to the variations of the different dialects (Clopper & Smiljanic 2011).

In American English, the southern dialect is reported to be stereotyped and slower than other dialects (Preston, 1998 *cited in* Clopper & Smiljanic 2011). Robb, MacLagan, and Chen (2004) (*cited in* Clopper & Smiljanic 2011) studied the New Zealand and American English and found that the New Zealand variety was significantly faster than American variety of English in terms of speaking rate and attributed it to the differences in the vowel quality and further hypothesized that these differences might lead to differences in rhythm between the two dialects.

Despite the vast information available on the segmental and lexical variability of dialects of Kannada (Bright, 1958; Ranganatha, 1982; Rajapurohit, 1982; Sridhar, 2007; Upadhyaya, 1976) the prosodic features of these dialects have remained largely unexplored. Patil (1986) studied Dharwad dialect of Kannada by recording (his own speech) and acoustically analysing 9 sentences, consisting chiefly of statements, surprise and questions. It was found that there was a complex interplay of F0, duration and intensity in determining the perception of intonation. The statements had a falling intonation pattern, and Yes/No questions had a rising pitch contour unlike the non-polar questions which had a falling intonation pattern.

Comparing the intonation patterns across the dialects helps in understanding the similarities and differences in the features of intonation across the dialects. In Studies on intonation in Kannada language have addressed the Mysooru- Bengalooru dialect but there are no studies which have compared the intonational features across dialects. Hence, this study is proposed to analyze and compare selected intonational features between the two dialects of Kannada Language (Dharwada and Mangalooru).

METHOD

Aims and Objectives

The study aims to analyze and compare selected features of intonation in the Yes-No questions uttered by adult native speakers of Dharwada and Mangalooru dialects of Kannada language.

The specific objectives of the study are to carry out the following:

1. *Perceptual analysis* of selected Yes-No questions uttered by the adult native speakers of Dharwada and Mangalooru dialect of Kannada language by trained judges to determine:
 - a) The utterances that shared common syntactic structure and frame from amongst the corpus recorded
 - b) The nucleus (primary stress) on syllables in each of the Yes-No utterance of the Intonation group/s of each speaker.
2. *Acoustic analysis* and comparison of selected Yes-No questions uttered by the adult native speakers of Dharwada and Mangalooru dialect of Kannada language to extract the following features of intonation:
 - a) Intonation Contours as a whole for contour shape, range, intonation groups and terminal contour.
 - b) Features of the nucleus (Primary and secondary stress):
 - i. F0, intensity and duration of the nuclear syllabus/bi.
 - ii. Occurrence of peak F0 in the intonation group/s of the contour on nucleus/i or non-nucleus/i segment of the utterance.
 - c) F0 features:
 - a. F0 range in the utterances.

- b. Declination/Inclination/Up-Step/ Down-Step of the Intonation groups/ contours.
- c. F0 gradient (Hz/sec) from initial to final syllable of the Intonation group/ contour
- d. F0 gradient (Hz/sec) of terminal word and terminal syllable in the intonation contour.
- d) Temporal features
 - a. Duration of Intonation Contour
 - b. Duration of the Terminal word
 - c. Duration of the Terminal syllable

Participants:

Twenty adult native Kannada speakers within the age range of 18 – 40 years (Mean age = 27.6 years) participated in the study. They were assigned into two groups viz. Group 1 (mean age = 30.9 years) consisting of ten participants speaking Dharwada dialect of Kannada as mother tongue (5 males and 5 females) and Group 2 (mean age = 24.3 years) consisting of ten participants speaking Mangalooru dialect of Kannada (5 male and 5 females). Written consent was obtained from each participant. Table 1 shows the demographic details of the participants.

Participant selection criteria:

1. Only native speakers of Kannada in the two dialects under study were included.
2. The participants were screened for any neurological, hearing, speech and language problems based on ICF Checklist Version 2.1a (WHO Work Group, 2004).

3. Only those who were not exposed to and/or had the expertise to speak other dialects of Kannada except for the dialect of interest in this study which they acquired as native language were included. The same was ascertained by administering a short checklist which was prepared by the investigator (Appendix 1).

Table 1

Demographic details of the participants in Dharwada and Mangalooru dialects

Group 1 (Dharwada dialect)			Group 2 (Mangalooru dialect)		
Participant	Age in approx. years/ Gender	Education	Participant	Age in approx. years/ Gender	Education
M1D	34 /M	Degree	M1M	25/M	Degree
M2D	39/M	Degree	M2M	40/M	Higher Secondary
M3D	35/M	Secondary	M3M	20/M	Degree
M4D	26/M	Degree	M4M	29/M	Higher Secondary
M5D	38/M	Degree	M5M	24/M	Diploma
F1D	28/F	Secondary	F1M	26/F	Diploma
F2D	30/F	Primary	F2M	21/F	Degree
F3D	25/F	Secondary	F3M	19/F	Diploma
F4D	24/F	Higher Secondary	F4M	19/F	Higher Secondary
F5D	30/F	Secondary	F5M	20/F	Degree
Mean age	30.9 years		Mean age	24.3 years	

Pilot Study

A pilot study was conducted to:

- a) *Choose the picture stimuli to elicit Yes/No questions as per the objectives of the study:* Three hand drawn picture cards, each representing a particular theme which was not emotionally loaded or was neutral to emotional expressions were selected. The theme of the 3 picture cards were as follows:
- (i) ‘Study Room’ (Appendix 2) (ii) ‘City’ and (iii) ‘Items used in the Kitchen’.

The first two pictures ('Study Room and 'city') were drawn by an artist as per the guidelines provided by the investigator and the third was adopted from a previous study by Rao, Manjunath, Manjula, & Sridhar (2010). The three pictures were rated by three Speech-Language Pathologists for ambiguity and emotional load. All the three were rated as being non-ambiguous and non-emotional.

- b) *Select one picture card which could elicit maximum number of syntactically similar expressions across speakers for Yes/No questions:* Six Kannada speaking adults (mean age = 29.5 years); three each speaking Mangalooru and Dharwada dialects and who were not part of the experiment were included. Both Mangalooru dialect speaking (mean age = 24 years) and Dharwada dialect speaking (mean age = 35 years) groups consisted of two females and one male each. Six more participants belonging to the same dialects as the speakers selected were included as communication partners.

A semi natural / simulated experimental condition was used where dyad pairs; a speaker (participant) and a communication partner participated at a time. The selected picture card was placed in front of the dyad. They were instructed to study the contents of the picture cards first. Then the participant/speaker was instructed to ask as many Yes-No questions related to the picture card to their communication partner. The communication partner in turn was instructed to answer questions asked by the participants appropriately, basing their answers on the content of the picture placed in front of the dyad. Each of the three picture cards were placed in front of the participant one after the other. *Although the responses of the listening partners also was recorded, they were not considered for any further analysis in this study as it was not of interest in*

the study. Those questions spoken by the participant were audio recorded on a digital tape recorder.

The Yes/No questions of all the participants were transcribed orthographically by the investigator to look for generation of Yes/No questions which had similar syntactic structure. The analysis revealed that the picture depicting the ‘Study Room’ elicited maximum number of syntactically similar sentences in participants of both the dialects. Thus, this stimulus card was selected as the material for eliciting Yes/No questions from the participants of the study.

Material:

Based on the pilot study, the picture card depicting the ‘Study Room’ was used as the material for eliciting the Y-N questions in the study. The picture card was printed on an A3 sized page and laminated (Appendix 2).

Experiment

A semi natural / simulated experimental condition was used where dyad pairs; a speaker (participant) and a communication partner participated at a time as described in the Pilot study. The procedure for elicitation of Yes/No questions from the speaker was the same as in the pilot study.

Procedure

The speech samples of the participants in the simulated experimental condition including the dyad pairs [speaker (participant) and communication partner] were collected individually in a noise free environment using a digital audio recorder (Olympus WS-550M). The Yes/No questions were elicited from the participant in the same way as explained in the pilot study. A few practice trials were allowed and the

participants were given practice to speak as naturally as possible. Although the speech samples of both the participant and the communication partner were recorded using the digital audio recorder, only the speech sample of the participant was considered for further analysis in this study. These were transcribed using Schiffman's (1979) procedure (Appendix 3). All the 223 questions uttered by participants of both the groups could be categorized into 38 sets based on similarity in the syntactic structure of the questions. However the analysis for perceptual and acoustic feature was carried out for each of the 223 questions and this is reported under various sections that follow. The 38 sets of questions which shared the common syntactic structure are shown in Table 2.

Analyses

All the recorded Yes/No questions were edited to omit those sections of the speech which were erroneous due to poor recording, repetition of words and phrases and/or other environmental influence using PRAAT software (Version 5.2.36) and the noise reduction was carried out using the noise reduction module of Cool edit pro (version 2.1) software, where ever necessary. The samples were subjected to perceptual and acoustic analyses as described below.

I. Perceptual Analysis

The perceptual analysis aimed at:

- a) Identifying the intonation groups in Y-N questions.
- b) Identifying the Primary Stress/ Nucleus and the secondary stress of the intonation groups/ contours in Y-N questions.

Table 2

Number of Yes/No questions analysed in the study across 38 sets of sentences having common syntactic forms [Transcribed using Schiffman's, (1979) transcription procedure]

SI No.	Questions	Dharwada			Mangalooru		
		M	F	T	M	F	T
Q1	/Teebal meele foon idiya/?	2	2	4	2	3	5
Q2	/ Teebal meele Telifoon idiya/?	1	0	1	1	0	1
Q3	/Teebal meele gaDiyaara idiya/?	2	3	5	1	4	5
Q4	/vaac Teebal meel idiya/?	1	1	2	2	2	4
Q5	/Teebal meele alaaram gaDiyaara idiya/?	1	1	2	1	0	1
Q6	/gooDe meele gaDiyaara idiya/?	4	0	4	4	1	5
Q7	/gaDiyaara gooDe meel idiya/?	1	0	1	2	1	3
Q8	/Teebal meele fyaan idiya/?	3	3	6	1	2	3
Q9	/ceer meele Taval idiya/?	3	1	4	2	2	4
Q10	/nelaD meele pyanT idiya/?	1	2	3	1	2	3
Q11	/nelad meele kii idiya/?	2	2	4	2	1	3
Q12	/nelad meele boTTal idiya/?	1	1	2	1	1	2
Q13	/gooDe meele TyuublaiT idiya/?	3	0	3	3	3	6
Q14	/nelad meele shuus idiya/?	1	2	3	3	3	6
Q15	/gooDe meele kyalenDar idiya/?	3	2	5	2	2	4
Q16	/kyalenDar gooDe meel idiya/?	1	0	1	1	0	1
Q17	/Teebal meele baacaNige idiya/?	4	2	6	2	2	4
Q18	/baacaNige Teebalmeel idiya/?	0	1	1	2	2	4
Q19	/Teebal meele pen idiya/?	2	0	2	1	3	4
Q20	/pen Teebal meel idiya/?	0	1	1	1	1	2
Q21	/Teebal meele buks idiya/?	0	2	2	3	3	6
Q22	/buk Teebal meel idiya/?	0	1	1	1	1	2
Q23	/jag Teebal meel idiya/?	1	1	2	1	2	3
Q24	/Teebal meele jag idiya/?	3	1	4	1	1	2
Q25	/glaas Teebal meel idiya/?	1	1	2	1	2	3
Q26	/Teebal meele glaas idiya/?	2	2	4	4	3	7
Q27	/Teebal meele lyamp idiya/?	2	0	2	1	0	1
Q28	/Teebalge naalku kaal idiya/?	2	1	3	1	1	2
Q29	/Teebal meele skeel iTTidaara/?	2	0	2	1	1	2
Q30	/skeel Teebal meel idiya/?	1	0	1	1	2	3
Q31	/kurci meele Topi idiya/?	2	1	3	3	2	5
Q32	/sTuulige muuru kaal idiya/?	2	1	3	1	0	1
Q33	/klok muur ganTe toorista/?	1	0	1	1	1	2
Q34	/shalfnalli buks idiya/?	1	1	2	0	1	1
Q35	/kaborDnalli pusTaka idiya/?	1	1	2	1	2	3
Q36	/Teebal meele kaNNaDka idiya/?	2	2	4	3	2	5
Q37	/kaNNaDaka Teebal meele idiya/?	1	0	1	2	0	2
Q38	/nelad meele DasTbin idiya/?	0	1	1	1	2	3
Total		60	40	100	62	61	123

Note. M=Males F=Females T=Total

The recorded samples were transcribed using Schiffman's, (1979) transcription procedure (Appendix, 3). Three judges from the field of Speech Language Pathology (including the investigator) were included for this. They were provided training to identify the nucleus of the intonation contours/ groups using speech samples which were not part of the study (sentences and Y-N questions). The training was provided by a person experienced in this area. In instances of disagreements, the exercise was repeated until there was minimum 90% agreement in the judgment made by the two judges.

The following criteria were used to identify the stress (Adopted from Manjula, 1997):

- i. Only Stress on syllables were identified
- ii. Hierarchically two levels of stress were identified: Primary and Secondary. A sentence could have more than one of these stress levels.
- iii. For identification of these stress levels, perceptual cues used were one or the combination of the following features:
 - Pitch of the syllable
 - Loudness of the syllable
 - Duration of the syllable
 - Pause
 - Semantic load on the word containing the syllable
 - Syntactic boundary markers or phrase boundary
 - Rate of speech

The identification of primary and secondary stressed syllables were relative within the sentence and within the speaker. During perceptual analysis, an attempt was made to analyse the questions into different intonation groups but it was observed that

majority of the sentences were short and contained only one intonation group, thus in the study all the sentences have been analysed considering them as having only one Intonation group. In the temporal analysis of total duration of the utterances, duration of the terminal word and the terminal syllable were analysed for the contour as a whole and not across intonation groups.

II. Acoustic Analysis (using PRAAT software Version 5.2.36)

Acoustic analysis was carried out for all the Yes/No questions of the speakers using PRAAT software (Version 5.2.36). These questions were saved individually in a hard drive of a computer for further analysis. Waveforms of these questions were obtained using PRAAT software. Figure 1, shows the screen display of waveform and Intonation contour of a model question analysed.

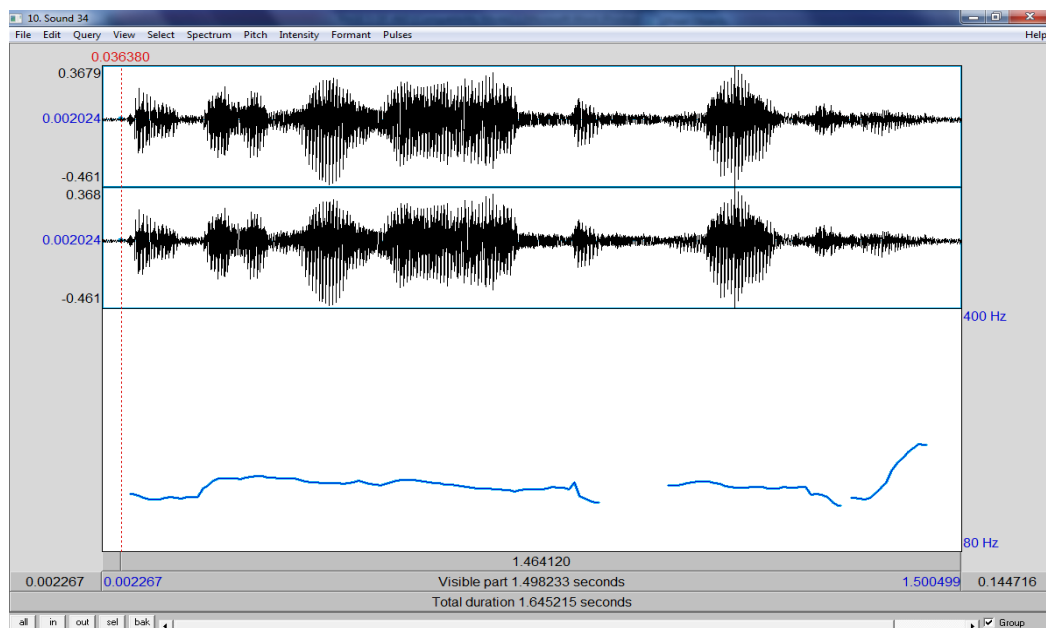


Figure 1. Screen display of a model waveform and Intonation contour analysed in the study

Following were the steps used for analysis

a. ***Plotting Intonation contours***: Intonation contours were extracted using the following steps:

- Open the required question file saved in the '.wav' format in the hard drive of the computer using PRAAT software
- Select the file in the PRAAT object menu >> To Manipulate >> set frequency range from 80 Hz to 300 Hz for males and 100 to 400 Hz for females >> Ok >> Extract Pitch Tier >> Ok

b. ***Analysing the features of the nucleus (Primary and secondary stress)***: Nucleus of the Intonation contour was marked in the waveform of the question selected by listening to the sample perceptually. The following measure were derived:

- i. *F0, intensity and duration of the nuclear syllabus/bi (Primary and secondary stress)*: From the marked nucleus, F0 and intensity were obtained using the PRAAT software from the 'Pitch' and Intensity' options provided in the PRAAT toolbar. The duration of the nuclear syllabus/bi was calculated manually by moving the cursor on the displayed waveform
- ii. *Occurrence of Peak F0*: The occurrence of peak F0 was carried out manually by visualizing the intonation contour displayed on the monitor. The peak F0 was then inspected for its place of occurrence with respect to the nuclear syllable/bi (primary stress) for extracting information on the placement of peak F0 relative to the pre-nuclear, post-nuclear and nuclear syllable/bi and also with respect to other syllables in the yes no questions which had the peak F0.

c. *Analysing F0 features*

- i. *Analysing the F0 range in the utterances:* The F0 range is defined as the frequency difference between maximum and minimum F0. The maximum and minimum F0 of individual utterances were obtained using the 'Pitch' option available in the PRAAT toolbar. Pitch >> Get maximum pitch and Pitch >> minimum pitch respectively. A difference of these pitch marking were obtained as F0 range of the utterances.
- ii. *Analysing the F0 gradient (Hz/sec) from initial to final syllable of the Intonation group/ contour:* The gradient of F0 is defined as the rate of change of F0 from initial to final syllable of the utterance. The gradient was calculated by dividing the obtained differences between the F0 of the initial syllable of the utterance and the F0 of the terminal syllable of the utterance divided by the total duration of the utterance.
- iii. *Analysing Declination/Inclination of the Yes No questions:* The features of declination/Inclination of the intonation contours were marked manually by the investigator by looking at the displayed waveform of the intonation contour of the question of interest. The relative sloping of the Intonation curve and the intonation curve pattern were considered for marking declination / inclination.
- iv. *Analysing the F0 gradient (Hz/sec) of terminal word and terminal syllable in the Yes No questions:* The gradient of the terminal word and terminal syllable were obtained using similar procedure as in the analysis of F0 gradient of Intonation group.

d. Temporal features

The temporal features refer to the durational features of the Yes/No questions being analysed. The *duration of whole utterance/intonation group*; *duration of terminal word* and *duration of terminal syllable* were all obtained using similar procedure as follows:

The waveforms of the individual utterances were obtained using PRAAT software. For obtaining the *duration of the utterances*, the whole utterances was selected manually using the cursor points, and the duration noted down. Similar procedures were followed for obtaining the duration of terminal word and terminal syllable.

Reliability Check

Inter judge reliability was checked on 10 % of the data by subjecting the data to acoustic analysis by a second judge. An experienced Speech Language Pathologist served as the second judge for the study. Intra judge reliability was also checked by the investigator repeating the acoustic analysis on 10% of the data after a period of 7 days from the initial analysis. Criteria of 80 -85 % agreement were met for intra and inter reliability checks.

Statistical Analysis:

The two groups in the study, viz., Group 1 (Dharwada dialect) and Group 2 (Mangalooru dialect) included 5 males and 5 females each (a total of twenty participants). The two independent variables considered were Group and Gender. Gender wise comparisons were carried out separately for group 1 and group 2 using Mann – Whitney U test. For the parameters which had significant gender effects,

Mann- Whitney U test was carried out to compare the groups. For the rest of the parameters which did not have significant gender effects, MANOVA and Repeated Measure ANOVA were used. The results of Repeated Measure ANOVA were verified with Wilcoxon's Signed Rank test. Reliability assessment was carried out using Cronbach's Alpha Test. Inter and intra group comparisons were made for the measures derived in the study.

The results of analyses are presented and discussed in the next chapter.

RESULTS AND DISCUSSION

The objectives of the study was to analyse and compare various features of intonation in selected Yes/No questions uttered by participants speaking Dharwada and Mangalooru dialects of Kannada language. The analysis was carried out in two steps:

1. *Perceptual analysis* of selected Yes-No questions uttered by the adult native speakers of Dharwada and Mangalooru dialect of Kannada language by trained judges to determine:
 - i. The utterances that shared common syntactic structure and frame from amongst the corpus recorded
 - ii. The nucleus (primary stress) on syllables in each of the Yes-No utterance of the Intonation group/s of each speaker.
2. *Acoustic analysis* and comparison of selected Yes-No questions uttered by the adult native speakers of Dharwada and Mangalooru dialect of Kannada language to extract the following features of intonation:
 - a. Intonation Contours as a whole for contour shape, range, intonation groups and terminal contour.
 - b. Features of the nucleus (Primary and secondary stress):
 - i. F0, intensity and duration of the nuclear syllabus/bi.
 - ii. Occurrence of peak F0 in the intonation group/s of the contour on nucleus/i or non-nucleus/i segment of the utterance.
 - c. F0 features:
 - i. F0 range in the utterances.

- ii. Declination/Inclination/Up-Step/ Down-Step of the Intonation groups/ contours.
 - iii. F0 gradient (Hz/sec) from initial to final syllable of the Intonation group/ contour
 - iv. F0 gradient (Hz/sec) of terminal word and terminal syllable in the intonation contour.
- d. Temporal features
 - i. Duration of Intonation Contour
 - ii. Duration of the Terminal word
 - iii. Duration of the Terminal syllable

I. Perceptual analysis

The speech sample of Group 1 (Dharwada dialect) and Group 2 (Mangalooru dialect) was analysed perceptually by three experienced judges including the investigator. An attempt was made to determine the number of Intonation groups in the Yes/No questions elicited. Most of the questions were of short duration (less than 1-2 sec) and > 90% of the questions had a single intonation group. Thus, for further analysis only single intonation group per question were considered. The results of the perceptual analysis are listed below.

a) Determining the utterances that shared common syntactic structure and frame from amongst the corpus recorded

The recorded Yes/No questions of the participants from Dharwada dialect (N = 10) and Mangalooru dialect (N = 10) were transcribed by the investigator using Schiffman's, (1979) transcription procedure. The transcribed speech samples were then analysed for its syntactic structure. The questions which were semantically

identical and which had similar syntactic forms (words used and its order in the sentence being the same across the participants belonging to the group) were selected for the purpose of future analysis. Differences in the syllable forms within words which was part of dialectal variation was ignored while selecting the common sentences. For example, the use of words such as /aitaa?/ (used by rural and semi urban population) and /idyaa?/ (used by literate and urban population) in Kannada which occurred at the end of the utterance and carried the question utterance are of same meaning but are different in terms of syllable structure. A corpus of 223 questions which had similar syntactic structure was collected from the 20 participants of the two groups. Table 3 provides the summary of the total number of questions recorded from the two groups of participants.

Table 3

Number of Yes/No questions uttered by the participants in the two groups

	Group 1 (Dharwada)	Group 2 (Mangalooru)	Total
Male	60	62	122
Female	40	61	101
Total	100	123	223

b) Determining the nucleus (primary stress) on syllables in each of the Yes-No utterance of each speaker.

Cruttenden (1997) reports four degrees of prominence in English language, and also points that not all languages have four degrees of stress. A study by Manjula (1997) which analyzed the degree of nuclear stress as a part of the analysis of intonation in interrogatives reported two levels of stress in Mysooru-Bengalooru dialect of Kannada language. The three judges perceptually identified three levels of

stress in the utterances of the Dharwada and Mangalooru participants, as primary, secondary and tertiary, but the frequency of occurrence of the tertiary stress as nucleus was lesser than the frequency of primary and secondary stress. The three degrees of stress on syllables in 10 % of the Yes/No questions was perceptually identified by the investigator and the two judges after a period of one week, by carrying out the task independently to also establish inter and intra judge reliability which was found to be an average of 85% and 89 % respectively. The instances of disagreements in the stress identifications were discussed until all the judges reached consensus.

Table 4, shows the percentage of occurrence of nuclear stress commonly identified by the three judges in 223 Yes/No questions of the two dialects (Dharwada and Mangalooru). Figure 2 and 3 shows the frequency of occurrence of primary, secondary and tertiary stress in the utterances of two dialects.

Table 4

Frequency of occurrence of stress

Group	Primary	Secondary	Tertiary	Total
Group 1 (Dharwada)	100 45.87%	98 44.95%	20 9.17%	218
Group 2 (Mangalooru)	123 47.30%	121 46.53%	16 6.15%	260
Total (Group 1+2)	223 46.65%	219 45.81%	36 7.53%	478

From the Table 4, Figure 2 and 3, it is observed that:

- Total of 478 stressed syllables in the 223 Yes No questions were identified by the judges. Overall, out of the three levels of stressed syllables identified, primary stress occurred 223 (46.65%) times; secondary stress

occurred 219 (45.81%) times and tertiary stress occurred 36 (7.53%) times
(Table 4)

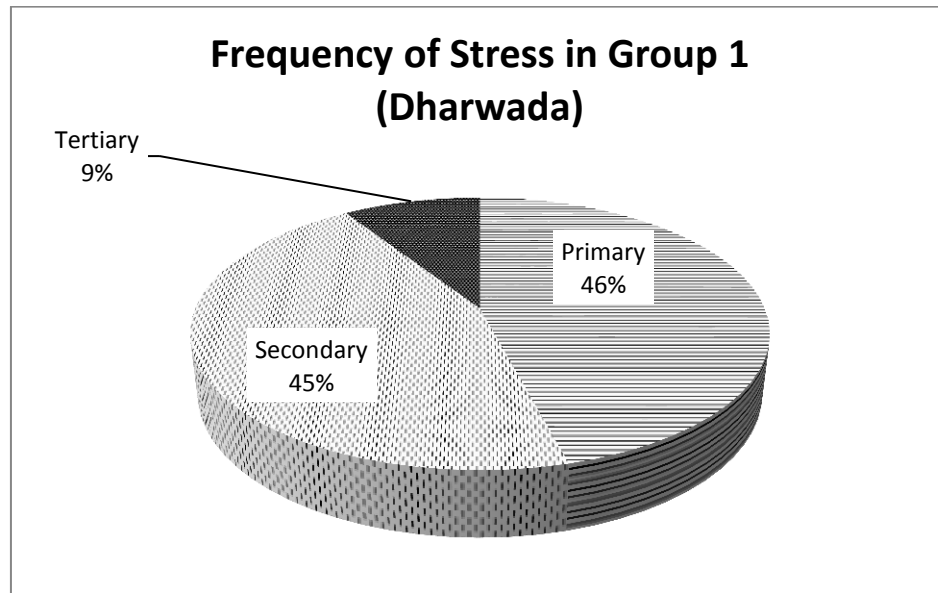


Figure 2. Frequency of occurrence of Stress in Group 1 (Dharwada)

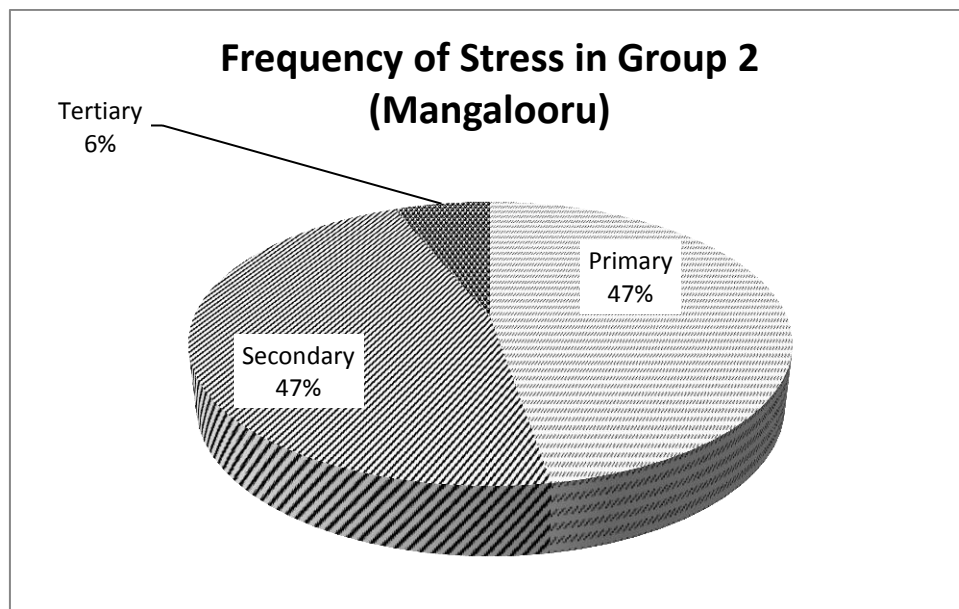


Figure 3. Frequency of occurrence of Stress in Group 2 (Mangalooru)

- The percentage of occurrence of Primary stress was 45.87% and 47.30% in group 1 and group 2 respectively.
- The percentage of occurrence of Secondary stress was 44.95 % and 46.53 % in group 1 and group 2 respectively.
- The tertiary stress occurred only for 9.17% and 6.15% of the times in group 1 and group 2 respectively

From figure 2 and 3, it is observed that the primary and secondary stress occur predominantly in Dharwada and Mangalooru dialects. This finding is consistent with the findings of Manjula (1997). *In this study however, the features of intonation subjected to acoustic analysis is restricted to primary stress (nucleus) only.*

II. Acoustic Analysis

Acoustic analysis was carried out for all the 223 Yes/No questions which were recorded from twenty speakers; ten each from Dharwada and Mangalooru dialects. Acoustic analysis of the entire data was carried out by the investigator of the study.

Reliability check for acoustic analysis: Ten percent of the data was subjected to reanalysis by another judge (who was equally qualified as the investigator) to test inter judge reliability for derivation and analysis of acoustic parameters. A high reliability co efficient was found ($\alpha = 0.99$) after running the Cronbach's Alpha Test.

a. Analysis of Intonation Contours of Yes-No questions (range, shape, intonation groups and terminal contour).

The intonation contours of 223 Yes/No questions having common syntactic forms within gender and within groups across the two dialects (Dharwada and Mangalooru) were superimposed to examine the similarities and differences in the following. In order to do this, F0 contours of each of these questions were obtained

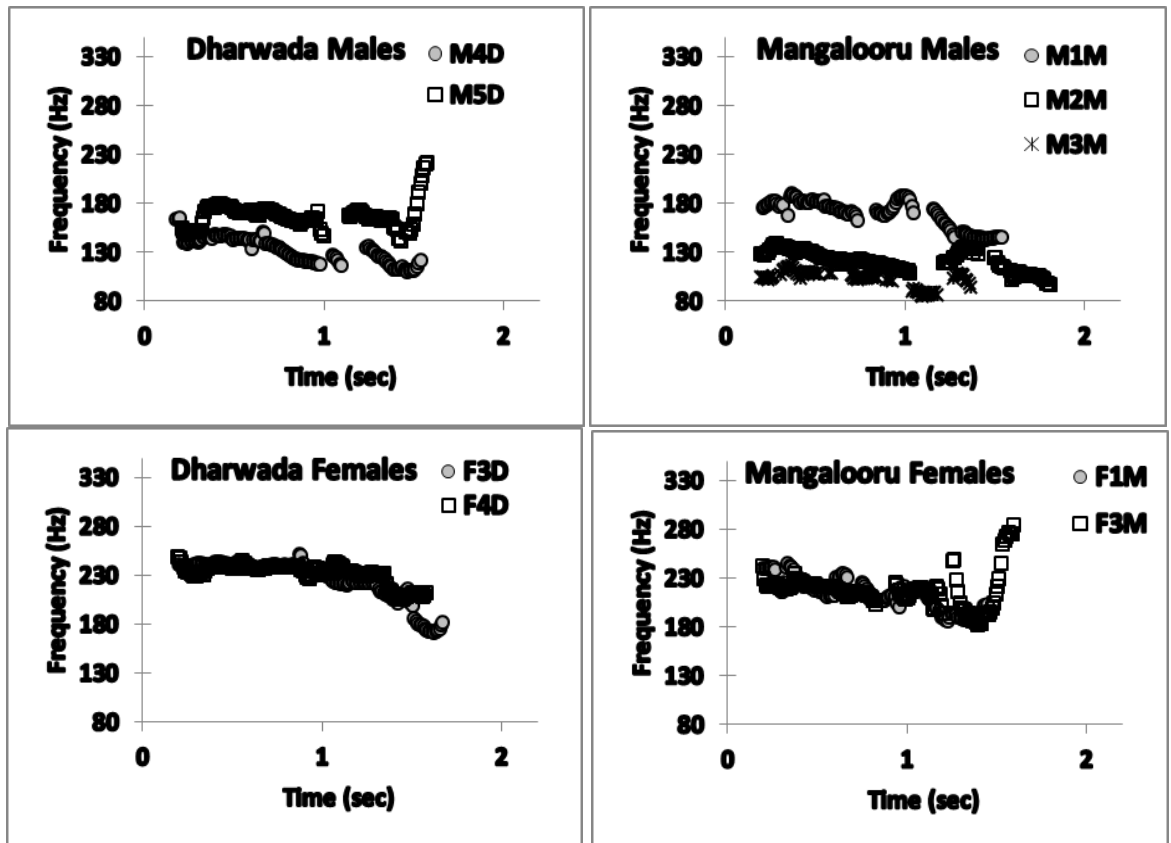
from PRAAT software and they were reconstructed in the Graphical format using Microsoft Excel. Figure 4 shows an example of the superimposed F0 contours for gender within group. The Intonation contours of all the questions analysed in this manner is presented in Appendix 4.

The following observations are made from the figure 4 and the rest of the figures presented in Appendix 4:

- Overall, there was terminal rising pattern observed for majority of the Yes – No intonation questions. The Yes/No questions in Mangalooru and Dharwada dialects depicted a rising pattern. Similar findings were observed in Yes/No questions for Mysooru – Bengalooru dialect of Kannada (Manjula, 1997; Nandini, 1985; Suma, 2007), Dharwada dialect of Kannada (Patil, 1986), Tamil (Natanasabapathy, 1986), English (Cruttenden, 1997; Snow, 1998), American English Pike, 1945), French (Delattre, 1967; Vion & Colas, 2006) , Japanese ((Abe, 1955) and some tonal languages (Cruttenden, 1997; Miller & Tench, 1981). Since, the terminal rise is observed in three major dialects of Kannada, Mysooru-Bengalooru (Manjula, 1997), Dharwada and Mangalooru (present study), it may be inferred that there is a terminal rising pattern for Yes/No questions in Kannada. These conclusions are drawn in a limited sense as there is a need to verify these findings with other study designs and this calls for further research.
- Generally a Rise-Fall-Rise or a Fall-Rise Intonation contour was observed. Similar findings are observed in English (Cruttenden, 1997), Italian (Chapallaz (1964) and Mysooru – Bengalooru dialect of Kannada (Namdini, 1985).

- The phrase boundaries / Intonation groups were marked distinctly in Mangalooru dialect than in Dharwada dialect. In the present study, due to shorter utterances, in most of the instances, only single Intonation group was present and hence further research is required to verify the distinctness of intonation contours for different lengths of intonation groups.
- High variability in the pattern was observed in the questions of Mangalooru Females. This may probably be due to large F0 range (discussed in further sections) seen among the females of Mangalooru dialect.
- Declination of F0 was a common trend in the questions of Mangalooru dialect while Inclinations of F0 was seen more in the questions of Dharwada dialect. This suggests that speakers of Dharwada dialect intoned the questions more naturally than the speakers of Mangalooru dialect.
- It was interesting to note that for a particular Yes/No question, there was no common pattern of intonation contour for any single question despite the questions being matched for common syntactic frame. It was observed that the same question was spoken with a rising contour by one speaker and with a falling contour by another in the same dialect. These findings are supported by the observations made by Pike (1945) who opines that there is no fixed intonation curve for questions, and the specific patterns depend not on the sentence type but on the attitude of the speaker and one intonation contour might have many individual meaningful parts.
- The second syllable of the initial word had either a higher F0 or lower F0 than the adjacent syllables. This further supports the notion of idiosyncratic patterns in the contour of Yes/No questions even within the speakers of the

Teebal meeLe kaNNaDaka idiya?



Teebal meeLe gaDiyaara idiya?

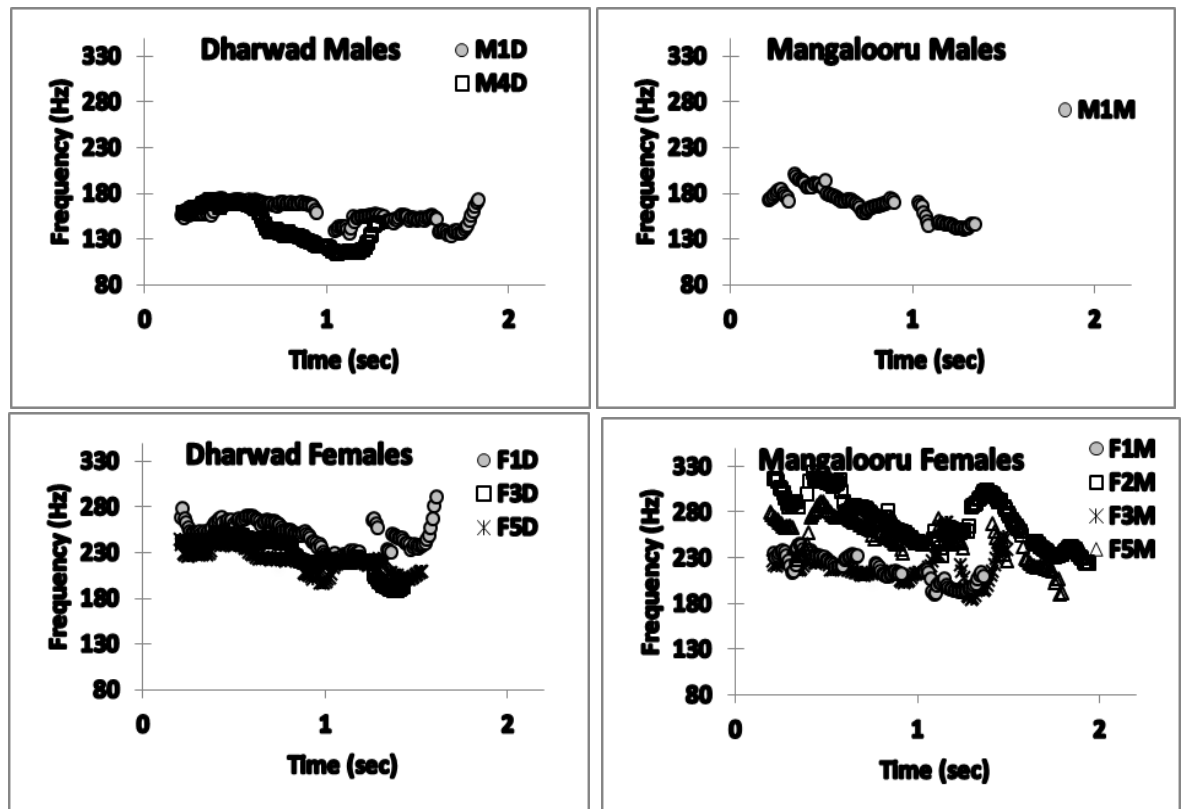


Figure 4. Examples of superimposed Intonation contours

same dialect uttering the questions with the same intent using the same segmental units as constituents of the syntactic structure.

- When holistically viewed, there seems to be a common pattern of Intonation used by speakers of both the dialects under study, suggesting that there is a universal intonation pattern (Cruttenden, 1997) observed in Kannada language. More research is needed to verify these findings.

b. Features of syllable/bi carrying Primary Stress & Secondary Stress

i. F0, intensity and duration of the syllabus/bi carrying primary stress / nucleus.

Acoustic analysis was carried out for the 223 questions obtained and F0, intensity and duration of the nuclear syllabus/bi were measured. Mann-Whitney U test was used to compare the values tabulated for males and females across Dharwada and Mangalooru dialect groups. Table 5 summarizes the F0, intensity and duration of nucleus (primary stress) of intonation contour.

The following observations can be made from Table 5:

- Both males (152.23 Hz) and females (243.34 Hz) of group 1 (Dharwada) have relatively higher *F0 of the Intonation contour* than males (134.95 Hz) and females (241.09) of group 2 (Mangalooru) respectively. The findings suggest that though not statistically significant, speakers of Dharwada dialects seem to be using a higher F0 on the syllable having primary stress (Nucleus of Intonation contour).
- Similarly, both males (63.42 dB) and females (61.78 dB) of group 1 (Dharwada) showed relatively higher *intensity of the Intonation contour* than

males (56.63 dB) and females (52.80 dB) of group 2 (Mangalooru) respectively. The speakers of Mangalooru dialect seem to be using a lower level of intensity for marking the nucleus of the Yes/No question.

Table 5

F0, Intensity and Duration of Primary stressed syllables in the Yes-No questions

Parameters	Male		Female		Total	
	Mean	SD	Mean	SD	Mean	SD
Group 1 (Dharwada)						
F0 (Hz)	152.23*	22.15	243.34*	21.14	197.78	52.17
Intensity (dB)	63.42	7.57	61.78	3.64	62.60 [#]	5.67
Duration (Sec)	0.134	0.03	0.138	0.02	0.136	0.03
Group 2 (Mangalooru)						
F0 (Hz)	134.95*	23.04	241.09*	24.43	188.02	60.25
Intensity (dB)	56.63	0.9	52.80	4.21	54.71 [#]	3.52
Duration (Sec)	0.140	0.03	0.158	0.03	0.149	0.03

Note. SD – Standard Deviation; * $p < 0.05$ – significant gender effect;

[#] $p < 0.05$ – significant group effect

- Males (0.140 sec) and females (0.158 sec) of Mangalooru group showed longer *duration of nucleus of the Intonation contour* compared to males (0.134 sec) and females (0.138 sec) of Dharwada group. The Mangalooru speakers seem to use a longer syllable to stress in a Yes/No question.

The statistical analysis shows that

- There was significant difference between males and females for *F0 of nucleus* of the Intonation contour in group 1(Dharwada) [$|Z| = 2.611$, $p < 0.05$] and in group 2 (Mangalooru) [$|Z| = 2.611$, $p < 0.05$]

- For *intensity of nucleus*, there was no significant difference between males and females in group 1 [$|Z| = 1.05$, $p > 0.05$] and in group 2 [$|Z| = 1.57$, $p > 0.05$]
- There was no significant difference between males and females for *duration of nucleus* of the Intonation contour in Dharwada [$|Z| = 0.11$, $p > 0.05$] and in Mangalooru [$|Z| = 0.95$, $p > 0.05$] groups

Thus, among the three parameters of the syllabi carrying primary stress (nucleus) analysed in the Intonation contours i.e. F0, intensity and duration, there was statistically significant difference among males and females in both the groups for the F0 of the nucleus of the Intonation contour. This difference is due to the inherent variants in the F0 of males and females i.e. Low pitch and High pitch respectively. Further, Mann – Whitney U test was again applied to the parameter *F0 of nucleus* to study the group effect. The results showed that:

- Overall, there was no significant difference between Dharwada group and Mangalooru group for *F0 of nucleus* [$|Z| = 0.605$, $p > 0.05$]
- There was no significant difference between males [$|Z| = 1.149$, $p > 0.05$] and between females [$|Z| = 0.522$, $p > 0.05$] in Dharwada and Mangalooru groups

On running Mann-Whitney U test, no significant gender effects were observed for the parameters *intensity and duration of the nucleus*, therefore, one- way MANOVA was carried out to find the group differences. The results showed that:

- There was significant difference between the groups for *intensity of nucleus* [$F(1,18) = 13.97$, $p < 0.05$] while there was no significant difference between the groups for *duration of nucleus* [$F(1,18) = 0.92$, $p > 0.05$].

Therefore, the results show that there was statistically significant difference between males and females in group 1 (Dharwada) and in group 2 (Mangalooru) for *F0 of nucleus* and significant difference between Dharwada group and Mangalooru group for *intensity of nucleus*.

- As observed earlier, the differences for F0 of nucleus in Intonation contours between males and females in both the groups were due to the inherent variations in the fundamental frequency between both the genders. The results have no effect on the dialectical variations.
- The intensity of the primary stress (Nucleus) of the Yes/No questions in Mangalooru speakers was lower intensity compared to the Dharwad dialect. This suggests that as a group the primary stress was effected with increased intensity by the Dharwad speakers compared to the Mangalooru speakers.
- Compared to intensity of the primary stressed syllables, the frequency and durational measures had no or little effect in differentiating primary stress in the two dialects i.e. Mangalooru and Dharwada dialects.

ii. ***F0, intensity and duration of the syllable/bi carrying Secondary stress***

F0, intensity and duration parameters of the syllables identified perceptually as carrying secondary stress were obtained for all the 223 sentences analysed. Mann-Whitney U test was used to compare gender differences in each group. Table 6, summarizes the F0, intensity and duration of Secondary stress of the intonation contour.

Table 6

F0, Intensity and Duration of Secondary stressed syllables in the Yes-No questions

Parameters	Male		Female		Total	
	Mean	SD	Mean	SD	Mean	SD
Group 1 (Dharwada)						
F0 (Hz)	154.88*	19.45	229.85*	28.64	192.37	45.76
Intensity (dB)	58.46	9.5	58.59	2.61	58.53 [#]	6.56
Duration (Sec)	0.17	0.04	0.148	0.03	0.159	0.03
Group 2 (Mangalooru)						
F0 (Hz)	129.31*	21.22	231.91*	18.6	180.62	57.26
Intensity (dB)	53.13	2.69	48.7	4.49	50.92 [#]	4.20
Duration (Sec)	0.156	0.07	0.148	0.026	0.152	0.05

Note. SD – Standard Deviation; * $p < 0.05$ – significant gender effect; [#] $p < 0.05$ – significant group effect

From Table 6, the following observations are made:

- Male speakers of Dharwada dialect showed a higher F0 (154.88 Hz) for syllables perceived as carrying secondary stress than the males (129.31Hz) of Mangalooru dialect, while in females of both the groups, similar F0 values for syllables with Secondary stress in a Yes/No questions is observed.
- Speakers of Mangalooru dialect have a lower intensity level (50.92 dB) for syllables with secondary stress than Dharwada dialect speakers (58.53 dB)

The statistical analysis reveals that:

- There is a significant difference between males and females for *F0 of Secondary stress* of the Intonation contour in group 1(Dharwada) [$|Z| = 2.611, p < 0.05$] and in group 2 (Mangalooru) [$|Z| = 2.611, p < 0.05$]

- There is no significant difference between males and females in group 1 (Dharwada) [$|Z| = 1.15, p > 0.05$] and in group 2 (Dharwada) [$|Z| = 1.78, p > 0.05$] for *intensity of Secondary stress*,
- There is no significant difference between males and females for *duration of Secondary stress* of the Intonation contour in Dharwada group [$|Z| = 0.636, p > 0.05$] and in Mangalooru group [$|Z| = 0.106, p > 0.05$]

Thus, among the three parameters analysed in the Intonation contours i.e. F0, intensity and duration, there was statistically significant difference among males and females in both the groups for the F0 of the Secondary stress of the Intonation contour. This difference is due to the inherent variants in the F0 of males and females .i.e. Low pitch and High pitch respectively. Also, the intensity and duration measures had no significant differences between males and females.

Mann-Whitney U test was run on the parameter F0 of Secondary stress to assess the group differences while One-way MANOVA was administered for the parameters intensity and duration of Secondary syllables to determine the group differences. The results showed that:

- Overall, there was no significant difference between Dharwada and Mangalooru group for *F0 of Secondary stress* [$|Z| = 0.68, p > 0.05$]
- There were no significant group differences observed for both males [$|Z| = 1.776, p > 0.05$] and females [$|Z| = 0.104, p > 0.05$]
- ◆ There was however, significant difference between the groups for *intensity of Secondary stress* [$F(1,18) = 9.50, p < 0.05$] while there was no significant difference between the groups for the parameter *duration of Secondary stress* [$F(1,18) = 0.13, p > 0.05$]

Results reveal that Dharwada group used intensity to cue secondary stress more than that of the Mangalooru group. This observation is similar to the trend observed for the primary stress also. Thus, it may be inferred that speakers of Mangalooru dialect did not use intensity as a cue to produce the primary or secondary syllable stress in Yes/No questions. Thus, in both the groups, the primary and Secondary stress patterns have an idiosyncratic pattern. It may be concluded that for the production of perceived syllable stress (primary and secondary) in Yes/No questions, speakers of Dharwada dialect consistency used a higher intensity than Mangalooru speakers.

iii. *Occurrence of peak F0 on nucleus/i or non-nucleus/i segment of the Yes/No utterances*

The Peak F0 (+ ve) is defined in this study as the highest value of F0 occurring on any one syllable of the given Yes/No question intonation. Results were computed to analyse for the occurrence of the peak F0 with respect to six locations:

- ‘Pre Nuclear’: Syllables occurring just prior to the primary stressed syllable/ nucleus of the given Yes/No question
- ‘On the Nucleus’: Syllable carrying the primary stress (nucleus) identified by the judges in the perceptual analysis.
- ‘Post nuclear’: Syllables following the primary stressed syllable/ nucleus of the given Yes/No question.
- Primary Stress occurring on the ‘initial syllable’ of the Yes/No question.
- Primary Stress occurring on the ‘terminal syllable’ of the Yes/No question.

- Occurrence of primary stress on ‘Other syllables in the utterance’ which is defined in this study as any syllable in the utterance other than the ones mention above .i.e. Pre-nuclear, nuclear, post nuclear, initial and terminal syllable of the utterance.

Table 7 and Figure 5 depict the occurrence of Peak F0 ‘on’ the primary stress (nucleus) and non nuclear syllables in the intonation in the Yes/No interrogative utterances.

From Table 7 and figure 5, it is observed that:

- Significant number of occurrences of the *Peak F0* has been on syllables other than the perceived nucleus (primary stress) of the Intonation contour in both Dharwada (82 %) and Mangalooru group (77.2 %), compared to the occurrence on syllables carrying the nucleus in both the Dharwada group (18 %) and Mangalooru group (22.8 %). The percentage of occurrence of F0 peak in the neighbourhood of the syllable perceived to be having Primary stress (nucleus) in a Yes/No question .i.e. ‘pre’ and ‘post’ syllables of nucleus along with the primary stress are also lesser in both Dharwada (28%) and Mangalooru (37.5%). This shows that F0 may not be a very important parameter in determining the primary stress in a Yes/No question for both Mangalooru and Dharwada dialects. This result is in consensus with the observations made by Manjula (1997) that F0 may not be the major cue in perception of Primary nucleus in Mysooru-Bengalooru dialect of Kannada language. Thus, for three major dialects of Kannada .i.e. Mysooru-Bengalooru, Dharwada and Mangalooru dialects of Kannada, F0 may not be a primary cue for the perception of Primary stress in a Yes/No question.

Table 7

Percentage Frequency Occurrence of Peak F0 on the syllable/s with primary stress (nucleus) and non nuclear syllables in the Yes/No interrogatives

Position with reference to nucleus	Group 1(Dharwada)			Group 2 (Mangalooru)		
	Male	Female	Total	Male	Female	Total
Pre	5 (8.3%)	3 (7.5%)	8 (8%)	2 (3.2%)	4 (6.6%)	6 (4.9%)
On	09 (15%)	09 (22.5%)	18 (18%)	7 (11.3%)	21 (34.4%)	28 (22.8%)
Post	2 (3.33%)	0	2 (2%)	4 (6.5%)	8 (13.1%)	12 (9.8%)
Initial Syllable	2 (3.33%)	13 (32.5%)	15 (15%)	3 (4.8%)	10 (16.4%)	13 (10.6%)
Terminal Syllable	20 (33.3%)	4 (10%)	24 (24%)	13 (20.9%)	13 (21.3%)	26 (21.1%)
Other Syllables	22 (36.7%)	11 (27.5%)	33 (33%)	33 (53.2%)	5 (8.2%)	38 (30.9%)
Total	60	40	100	62	61	123

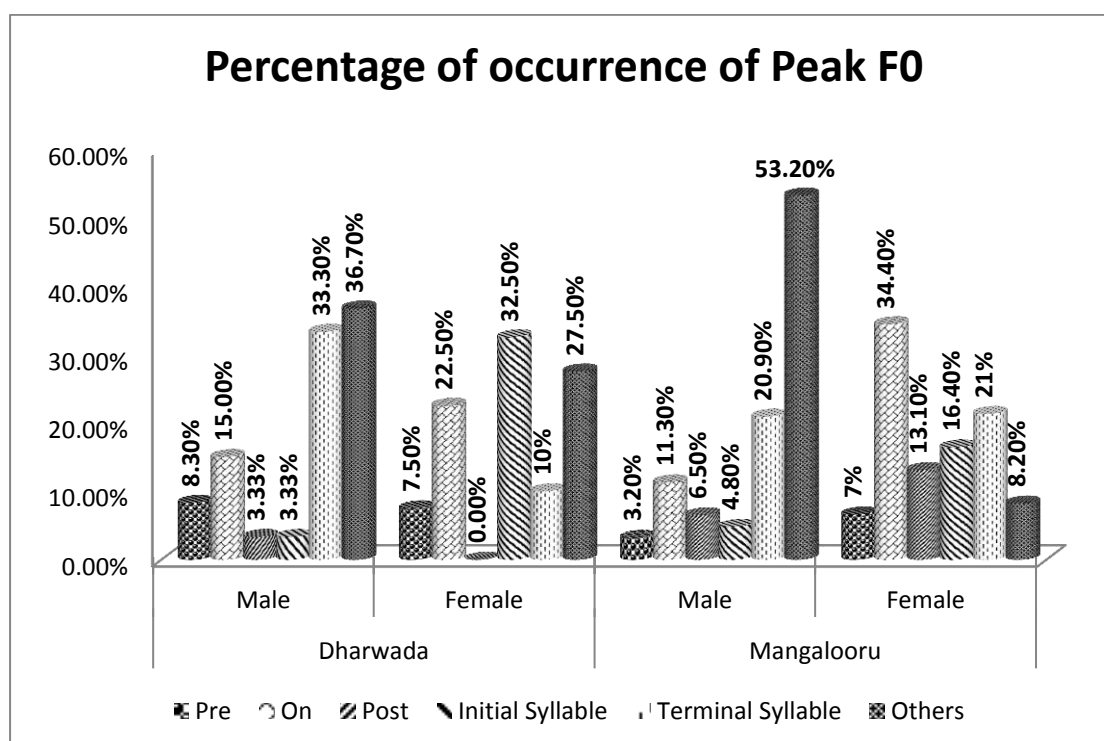


Figure 5: Percentage of occurrence of Peak F0 with reference to various syllabi locations of the Yes No questions

- Hierarchically, Peak F0 occurred majorly on ‘other syllables in the utterance’ in both Dharwada (33 %) and Mangalooru (30.9 %) group of speakers. This finding is in line with the findings of Manjula (1997) in Mysooru-Bengalooru dialect of Kannada. These findings suggest that F0 peak can occur on any syllable of the utterance irrespective of the stress pattern perceived in Yes/No questions in Dharwada and Mangalooru dialects of Kannada language.
- Interestingly, in Dharwada dialect, a higher percentage of occurrence of F0 peak was observed on Terminal syllable of the Intonation contour (24 %) than on the syllable with primary stress (nucleus) (18 %) in the Yes/No question while in Mangalooru dialect, almost similar percentage of occurrence of the F0 peak on nucleus (22.8 %) and on Terminal syllable (21.1 %) is observed. Speakers of Dharwada dialect use rising pitch more often on the terminal syllable of the Yes/No questions than during the production of syllable with primary stress in that question.
- Percentage of occurrence of F0 peak in initial and terminal syllable of the utterance was more in Dharwada dialect than in Mangalooru dialect. Thus, it may be inferred that speakers of Dharwada dialect generally have higher pitch registers in Yes/No questions than speakers of Mangalooru dialect of Kannada.
- With regard to the occurrence of peak F0 on the adjacent syllables of nucleus/primary syllable/s of the Intonation contour, it is observed that the syllables following the nucleus showed a lower percentage of occurrence of F0 peaks in Dharwada (2 %) than in Mangalooru dialect (12 %). Manjula (1997) observed that in Mysooru- Bengalooru dialect of Kannada, positive F0 peaks occurred more on syllables following the stressed (primary and secondary)

syllables. The speakers of Mangalooru dialect in this study showed similar trend as that of Mysooru- Bengalooru dialect.

- Comparison across gender reveals that in female speakers, higher percentage of F0 peaks occurred 'On' the nucleus and on initial syllable compared to the males in both the groups.
- Males in Dharwada dialect showed a higher percentage (33.30 %) of F0 peaks on terminal syllable in the question than females (10 %) while females showed a higher percentage of occurrences of F0 peak (32.5 %) on initial syllable than males (3.33 %). In other words, in the group speaking Dharwada dialect, males used a higher pitch in the beginning of the Yes/No questions while the females used a higher pitch at the end of the Yes/No questions. On the other hand, a variable trend was noticed in female speakers of Mangalooru dialect 'on other syllables in the utterance' but in males for the same syllables, it was higher (53.20%).

Although the peak F0 did not show predominance of occurrence in any one position, there seems to be similar trend in the both dialects. In both the dialects, more than 1/3rd of the total F0 peaks occur in 'other syllables in the utterance' while another 1/3rd of the peaks occur in initial and final positions. F0 peaks occur more 'on' the nucleus of the Intonation contour in Mangalooru dialect (22.8 %) than in Dharwada dialect (18 %).

Thus, it may be inferred that perceived stress may not be concurrent with the acoustic feature of Peak F0 .i.e. the stress perception may not be dependent on the perception of F0 attributes alone. This finding is in consensus with the findings of Manjula (1997), where position of Peak F0 was studied with respect to primary and

secondary stressed syllables in a Yes/No questions and similar results were obtained. Perception of stress could be influenced by independent or combined effect of F0, intensity and duration. However, this needs to be verified with further research.

b. F0 features

i. F0 range in the utterances

The F0 range is defined in this study as the difference between the maximum and the minimum F0 in an intonation contour of a given Yes No question. Table 8 shows the group mean and standard deviation (SD) for minimum, maximum and range of F0 for the two groups across both the gender

Table 8

Group Mean in Hertz and SD for Minimum, Maximum and Range of F0 for Yes/No questions in the two dialects

F0 in Hertz	Male		Female		Total	
	Mean	SD	Mean	SD	Mean	SD
Group 1 (Dharwada)						
Minimum	124.98*	12.34	210.33*	18.60	167.65	47.38
Maximum	188.75*	28.86	274.97*	24.94	231.86	52.07
Range	63.77	19.84	64.64	16.67	64.20	17.28
Group 2 (Mangalooru)						
Minimum	109.53*	18.29	202.06*	18.06	155.79	51.69
Maximum	157.76 *	27.53	285.00 *	25.79	221.38	71.62
Range	48.23	9.85	82.94	13.83	65.59	21.51

* p < 0.05

From Table 8, it is observed that:

- Both males (109.53 Hz) and females (202.06 Hz) of Mangalooru group showed a lower 'minimum F0' compared to Dharwada group (124.98 & 210.33 Hz respectively). The 'maximum F0' in Mangalooru males were lesser (157.76 Hz) than that of Dharwada males (188.75 Hz), Mangalooru males showed the least F0 range. Mangalooru females (285 Hz) showed a higher 'maximum F0', than the females of Dharwada group (274.97 Hz) and also showed the largest F0 range. In other words, Mangalooru males showed lower F0 range than Dharwada males and Mangalooru females had a higher F0 range than Dharwada females, also indicating that the females of Mangalooru dialect produced a well intoned Yes/No questions whereas the male counterparts were more monotonous in their production of Yes/No questions.
- Over all, Mangalooru group showed lower 'minimum F0' (155.79 Hz) and lower 'maximum F0' (221.38 Hz). In F0 range, Dharwada group (64.20 Hz) showed slightly lower value than Mangalooru group (65.59 Hz). Interestingly, Mangalooru males (48.23 Hz) showed lowest F0 range while Mangalooru females (82.94 Hz) had the highest F0 range. Male speakers from Mangalooru dialect seem to have a restricted F0 range than Males of Dharwada dialect. Also these differences may be related to the differences in approach (attitude, emotion) of males and females towards the task (Daly & Warren, 2001)
- On using Mann-Whitney U test on groups, a significant difference between males and females for both *minimum and maximum F0* of the Intonation contour [$|Z| = 2.611$, $p < 0.05$] was seen. The differences in the F0 parameters between males and females are because of the inherent anatomical and physiological differences in the voice production mechanism between

them. For *range* of F0, there was significant gender effect observed only in Mangalooru group [$|Z| = 2.611$, $p < 0.05$] while no significant gender effect was observed in Dharwada group [$|Z| = 0.104$, $p > 0.05$]. Both males and females of Dharwada group seems to have similar F0 range. Larger variation between males and females for F0 range was evident in Mangalooru dialect, with females having a larger F0 range than males. These findings are in consensus with the observations made by Barry (2007) (*cited in* Clopper & Smiljanic, 2011), wherein, intonation of Southern British English and Southern California English was compared and it was found that, females had a higher range than males (Barry, 2007).

- Mann Whitney U Test was carried out to find the differences among the two groups for *minimum. maximum and range of F0*. The results showed that there was no significant difference between Dharwada group and Mangalooru group for *minimum F0* [$|Z| = 0.68$, $p > 0.05$], *maximum F0* [$|Z| = 0.378$, $p > 0.05$] and *F0 range* [$|Z| = 0.076$, $p > 0.05$]. Also, there was no significant difference between males for *minimum F0* [$|Z| = 1.149$, $p > 0.05$], *maximum F0* [$|Z| = 1.567$, $p > 0.05$] and *F0 range* [$|Z| = 1.358$, $p > 0.05$] and no significant difference between females for *minimum F0* [$|Z| = 0.731$, $p > 0.05$], *maximum F0* [$|Z| = 0.522$, $p > 0.05$] and *F0 range* [$|Z| = 1.149$, $p > 0.05$].
- The results show that there was no statistically significant difference between Dharwada and Mangalooru dialect for *minimum. maximum and range of F0*. There was no advantage seen for one group over the other for F0 range. The F0 range is almost similar between Dharwada and Mangalooru dialect while

there is higher inter group variations between males and females in Mangalooru dialect. Yes/ No questions in general were produced with a range of approximately 65 Hz in both the groups.

ii. *Declination/Inclination in Yes/No questions*

Inclination and Declination are referred as the phenomenon of inclining or declining pitch from initial to final position in the Intonation contour. Phenomenon of Declination/ Inclination is reported in many languages including English, Danish, Italian (Cruttenden, 1997) and Kannada (Manjula, 1997). The phenomenon of Declination is reported to be suspended for Yes/No questions in many languages like Danish and Russian (Cruttenden, 1997). In Mysooru-Bengalooru dialect of Kannada language, there seems to be a high occurrence of declination (Manjula, 1997). In the present study the phenomenon of inclination and declination were measured for both the groups and the same is represented in Table 9 and Figure 6.

Table 9

Frequency of occurrence of Inclination/Declination of Intonation contours

	Dharwada group			Mangalooru group		
	Male	Female	Total	Male	Female	Total
Number of sentences	60	40	100	62	61	123
Inclination	53 (88.3%)	20 (50%)	73 (73%)	34 (54.8%)	41 (67.2%)	75 (60.9%)
Declination	07 (11.7%)	20 (50%)	27 (27%)	28 (45.2%)	20 (32.8%)	48 (39%)

Note. SD – Standard Deviation

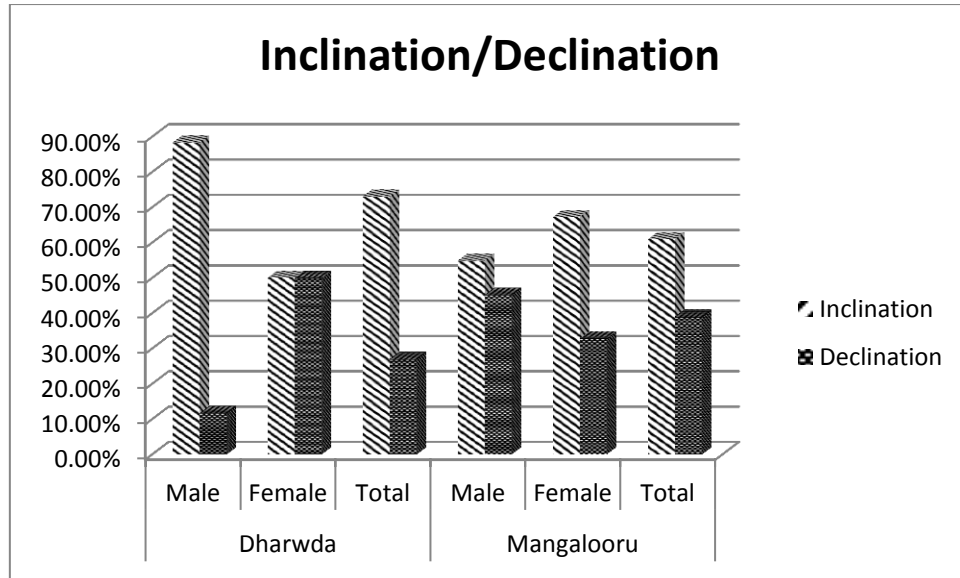


Figure 6: Percentage of occurrence of Inclination/ Declination in the Intonation contour

The following observations can be made from Table 9 and Figure 6:

- There was relatively high percentage of Inclination (66.4%) compared to Declination (33.6%) in both the groups. Thus, it is indicative that the Yes/No questions in the Dharwada and Mangalooru dialects of Kannada are spoken with an inclined intonation contour, or raising pattern of intonations was observed in both the groups. These findings are in line with the findings of Bolinger (1978) (*cited in* Cruttenden, 1997) who surveyed 36 non-tonal languages and reported that in 32 of the languages interrogatives generally had a rising pattern in Yes/No questions. Cruttenden (1997) also observed that most of the languages in the world have a rising pattern on intonation contour for Yes/No interrogatives.
- Dharwada group had relatively higher percentage of occurrence of Inclination (73%) than Mangalooru group (60.9%). In other words, speakers of Dharwad

dialect showed a higher raising pattern of Intonation than speakers of Mangalooru dialect for Yes/No questions.

- On comparison across genders, in Dharwada group, males (88.3%) showed higher percentage of occurrence of Inclination than females (50%) while in Mangalooru group, females (67.2%) showed higher percentage of occurrence of inclination than males (54.8%). Thus, there were differences between males and females of both the groups. Mangalooru females had more inclined pattern than the males, this may be attributed to the higher percentage of occurrence of Peak F0 on terminal syllable of the utterances (discussed in previous sections) .i.e. to say there was an up-trend of F0 observed for Mangalooru females, where in peak F0 values were observed in Terminal syllables of the Intonation contour.

iii. *F0 gradient (Hz/sec) from initial to final syllable of the Intonation contour*

F0 gradient is defined as the rate of change of F0 (Hz/sec). F0 varies from initial to final syllable in an Intonation contour. These F0 changes over time were calculated for the whole utterance and Table 10 summarises the F0 gradient from initial to final syllable of the Intonation contour.

Table 10

F0 gradient for Intonation contour

Groups	Male		Female		Total	
	Mean (Hz/sec)	SD	Mean (Hz/sec)	SD	Mean (Hz/sec)	SD
Dharwada	22.58	13.89	20.81	8.80	21.69	8.79
Mangalooru	19.30	6.11	24.36	8.00	21.76	9.06

Note. SD – Standard Deviation

Mann-Whitney U test was carried out to find the differences between males and females across both the groups and the results show that:

- There was no significant difference between males and females for *F0 gradient* of the Intonation contour in Dharwada group [$|Z| = 0.313$, $p > 0.05$] and in Mangalooru group [$|Z| = 1.149$, $p > 0.05$]. Therefore, one-way MANOVA was carried out to find the group differences. The results of one-way MANOVA showed that:
- There was no significant difference between Dharwada group and Mangalooru group for *F0 gradient of Intonation contour* [$F(1,18) = 0.001$, $p > 0.05$]

From Table 10 and above statistical results it is inferred that:

- The speakers of Dharwada and Mangalooru dialects did not vary much in their utterance of Yes No questions in terms of the F0 gradient of the Intonation contour and there is no difference between males and females within group and across the groups. That is to say there is no effect of dialect on the F0 gradient of the Intonation Contour.

iv. *F0 gradient (Hz/sec) of terminal word and terminal syllable in the intonation contour*

The gradient of the terminal word was compared with the terminal syllable between the groups and between males and females within groups. Mann-Whitney U test was carried out to find the gender effect for *gradient of terminal word* and *gradient of terminal syllable*. Table 11 and Figure 7 summarises the results.

Table 11

The Gradient of the terminal word and Gradient of the terminal syllable

Gradient – Terminal	Male		Female		Total	
	Mean (Hz/sec)	SD	Mean (Hz/sec)	SD	Mean (Hz/sec)	SD
Group 1 (Dharwada)						
Word	77.30	43.22	65.54	35.77	71.42	37.91
Syllable	288.40	144.62	147.65	101.74	218.02	139.28
Group 2 (Mangalooru)						
Word	63.04	30.01	75.12	38.80	69.08	33.32
Syllable	150.29	144.67	143.73	124.91	147.01	127.47

Note. SD – Standard Deviation

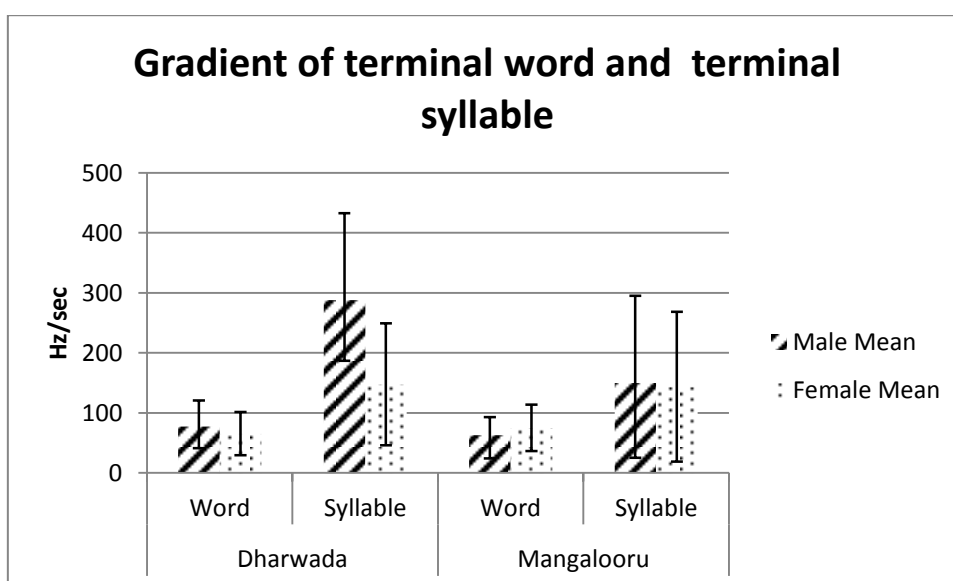


Figure 7. Mean and Standard deviation of Gradient of the terminal word and Gradient of the terminal syllable

From Table 11 and Figure 7 it is observed that:

- In Dharwada group, there was no significant difference between males and females for *gradient of terminal word* [$|Z| = 0.522$, $p > 0.05$] and *gradient of terminal syllable* [$|Z| = 1.567$, $p > 0.05$]

- In Mangalooru group also, there was no significant difference between males and females for *gradient of terminal word* [$|Z| = 0.313$, $p > 0.05$] and *gradient of terminal syllable* [$|Z| = 0.104$, $p > 0.05$]

Repeated measure ANOVA was carried out to compare *gradient of terminal word* and *gradient of terminal syllable* with group as independent factor. The results revealed that overall, there was significant difference between *gradient of terminal word* and *gradient of terminal syllable* [$F(1,18) = 21.34$, $p < 0.05$]. There was no interaction effect observed between groups and *gradient of terminal word* and *gradient of terminal syllable* [$F(1,18) = 2.99$, $p > 0.05$]. Since the Standard deviation of the *gradient in words* and *gradient of syllable* were high, the results of Repeated Measure ANOVA were cross verified with Wilcoxon Signed Ranks test. The results show that in Dharwada group, there was significant difference between *gradient of terminal word* and *gradient of terminal syllable* [$|Z| = 2.803$, $p < 0.05$] and in Mangalooru group, there was no significant difference between the *gradient of terminal word* and *gradient of terminal syllable* [$|Z| = 1.784$, $p > 0.05$].

From the above findings it can be inferred that:

- In Dharwada dialect, there was significant difference between *gradient of terminal word* and *gradient of terminal syllable* while there was no significant difference between them in Mangalooru dialect. In other words, it can be concluded that in Dharwada group, there is higher pitch movement in the terminal syllable than in terminal word for Yes/No questions. These findings are in consensus with the findings of Manjula (1997) in Mysooru dialect of Kannada while these findings may not be in complete agreement with the observations made by Suma (2007) who opined that the loci of F0 to

distinguish a statement from Yes/No questions may not be terminal syllable itself but the loci could have spread over the entire terminal word.

- There is a dialect specific trend observed for *gradient of terminal word* and *gradient of terminal syllable*; Yes/No questions in Dharwada dialect showed a sharper rise of F0 in terminal syllable than for the terminal word while speakers of Mangalooru dialect showed a rise pattern across the terminal word.
- There were no differences between males and females in both groups, which contradicts the results of Barry (2007) (*cited in* Clopper, & Smiljanic, 2011) where, it was observed that females had a higher rising intonation at the end of the sentences.

c. Temporal features

Temporal features analysed in the study are the duration of the Intonation contour, Terminal word and Terminal syllable of the Yes/No questions. The *duration of the Intonation contour* is the length of the whole question; *duration of terminal word* is the length of the final word of the question and *duration of the terminal syllable* is the length of the final syllable of the terminal word.

i. Duration of Intonation contour

Mann-Whitney U test was administered to find the gender effect for duration of the Intonation contour and the results are summarised in Table 12.

Table 12

Duration of Intonation contour

Groups	Male		Female		Total	
	Mean (sec)	SD	Mean (sec)	SD	Mean (sec)	SD
Dharwada	1.39	0.18	1.40	0.21	1.39	0.18
Mangalooru	1.30	0.06	1.35	0.08	1.33	0.07
Total	1.34	0.13	1.37	0.15	1.36	0.14

Note. SD – Standard Deviation

The following observations can be made from the Table 12

- Both in Dharwada [$|Z| = 0.524$, $p > 0.05$] and in Mangalooru [$|Z| = 0.97$, $p > 0.05$] group, there was no significant difference between males and females for *duration of Intonation contour*. Therefore, one- way MANOVA was carried out to find the group differences between them. The results showed that There was no significant difference between the two groups for *duration of Intonation contour* [$F(1,18) = 1.16$, $p > 0.05$].

Thus, there was no gender difference nor any dialectical trend observed for *duration of Intonation contour*. Both the dialects seem to be having a similar length of Yes/No questions. Even with the morpho-phonemic variations present between the Mangalooru and Dharwada dialects (Sridhar, 2007; Upadhyaya, 1976), there seems to be no difference in the duration of the utterances.

ii. *Duration of the Terminal word*

The duration of the final words in the questions were analysed and Mann-Whitney U test was administered to find the gender effect and the results are summarised in Table 13.

Table 13

Duration of Terminal word

Groups	Male		Female		Total	
	Mean (sec)	SD	Mean (sec)	SD	Mean (sec)	SD
Dharwada	0.330	0.064	0.348	0.033	0.339	0.490
Mangalooru	0.366	0.074	0.364	0.061	0.365	0.064
Total	0.348	0.068	0.356	0.047	0.352	0.056

Note. SD – Standard Deviation

The following observations can be made from the Table 13

- Both in Dharwada [$|Z| = 0.943$, $p > 0.05$] and in Mangalooru [$|Z| = 0.106$, $p > 0.05$] group, there was no significant difference between males and females for *duration of Terminal word*. Therefore, one- way MANOVA was carried out to find the group differences between them. The results showed that there was no significant difference between the two groups for *duration of Terminal word* [$F(1,18) = 1.04$, $p > 0.05$].

The results showed that there was no significant difference between Dharwada group and Mangalooru group for *duration of the Terminal word*. Therefore there are no dialectical trends observed for duration of Terminal word in Yes/No questions. All the Terminal words in the questions analysed in the study were non-WH question markers like /aiTa/ /idya/ /unTa/ etc. Also, only Yes/No questions having common syntactic forms (like sentence structure, word order, number of syllables) were analysed in the study. Therefore, the duration of the terminal syllable having a common syntactic form across the two dialects might not have been significantly different in between the groups. Further research is necessary to assess the duration of terminal syllables in a Yes/No questions across different syntactic forms.

iii. *Duration of the Terminal syllable*

The *duration of the Terminal syllable* in the question was analysed and Mann-Whitney U test was administered to find the gender effects and the results are summarised in Table 14

Table 14

Duration of Terminal syllable

Groups	Male		Female		Total	
	Mean (sec)	SD	Mean (sec)	SD	Mean (sec)	SD
Dharwada	0.126	0.047	0.174	0.093	0.150	0.074
Mangalooru	0.116	0.019	0.146	0.042	0.131	0.035
Total	0.35	0.07	0.36	0.05	0.141	0.057

Note. SD – Standard Deviation

The following observations can be made from the Table 14.

- Both in Dharwada [$|Z| = 0.964$, $p > 0.05$] and in Mangalooru [$|Z| = 1.80$, $p > 0.05$] group, there was no significant difference between males and females for *duration of Terminal syllable*. Therefore, one- way MANOVA was carried out to find the group differences between them. The results showed that there was no significant difference between the two groups for *duration of Terminal syllable* [$F(1,18) = 0.541$, $p > 0.05$].

The results show that there was no significant difference between Dharwada group and Mangalooru group for *duration of the Terminal syllable*. No dialectical trends were observed for duration of Terminal syllable.

The Yes/No question analysed were of short length (1-2 sec) and only questions with common syntactic forms were analysed. Therefore, may be the temporal features (Duration of Intonation contour, Terminal word and syllable) may not be significantly different between the groups or there might be no dialectal difference in the temporal features taken in the study between the Dharwada and Mangalooru dialects of Kannada.

Thus, from the above findings we can observe that:

In common, the Yes No questions in both the Dharwada and Mangalooru dialects showed terminal raising intonation pattern; but, there were evident inter group variations in the Yes No intonation contours within male and female participants of Mangalooru dialect than Dharwada dialect. Rise-Fall-Rise or Fall-Rise pattern of intonation contour was observed in common for both the dialects in majority of the Yes No questions. The intonation contours of Dharwada group showed a higher frequency of occurrence of inclination patterns as compared to declination patterns in the Yes No questions. The same was true with respect to the Mangalooru group; but the frequency of occurrence was far less than that of Dharwada group. Although there was a trend observed in the intonation contours within and across the dialectal groups, there were few exceptions wherein the contours did not show commonality.

Analysis of the acoustic correlates of stressed syllables within the questions (primary and secondary) revealed that speakers of Mangalooru dialect showed variable pattern of use of F0, Intensity and Duration to cue stressed syllables whereas speakers of Dharwad dialect showed a clear trend of using intensity as a feature to cue the stressed syllables in the Yes No questions. In other words, F0 and duration did not

serve as major acoustic features to cue the perceptually identified stressed syllable in the Yes No questions. Further the peak F0 did not concur with the perceptually identified stressed syllables, leading to the inference that in Yes No questions, F0 may not serve as a primary cue in the perception of primary stress in Yes/No interrogatives as this trend was observed in both the groups. Further, it was observed that peak F0 occurred on any syllable of the utterance irrespective of perceived stress in questions in both the dialects. There were however, few instances where the female speakers showed a higher percentage of F0 peak on the nucleus than males.

Between the dialects, it was observed that speakers of Dharwada dialect had higher pitch registers and more often used a raising intonation pattern in terminal syllable in Yes/No questions. In Dharwada dialect, males used a higher pitch at the beginning of the Yes/No questions while females used a higher pitch at the end of the question.

The range of F0 was similar for both the dialects (approximately 65 Hz) while females of Mangalooru dialect had a higher F0 range than the rest. On comparing the gradient of terminal word and terminal syllable, speakers of Dharwada group showed a higher pitch movement (sharper rise) in the terminal syllable while speakers of Mangalooru group showed rise across the terminal word. There were no dialectical differences observed with respect to the temporal features such as duration of the whole question, duration of the terminal word and terminal syllable in the yes no questions.

The salient findings are summarized in the next chapter.

SUMMARY AND CONCLUSIONS

Kannada which is one of the major Dravidian languages, spoken mainly in the state of Karnataka has at least seven clearly distinct dialects (Rajapurohit, 1982; Sridhar, 2007). However, four of them (Mysooru, Dharwada, Mangalooru and Gulbarga) are considered the major dialects of Kannada language (Rajapurohit, 1982; Sridhar, 2007; Upadhyaya, 1976). Research studies addressing Intonational features of these dialects are scarce. Intonation in Mysooru- Bengalooru dialect which is considered as the standard dialect (Rajapurohit, 1982; Sridhar, 2007; Upadhyaya, 1976) of Kannada has been studied by few (Manjula, 1979, 1997; Nandini, 1985; Nataraj, 1981; Rao et. al, 2010; Suma, 2007; Vandana, 1999). Intonation in Dharwada dialect has been studied by Patil (2007) based on single subject data and using subjective procedure, while there is little or no research available on the Intonation variations in rest of the dialects. The present study aimed to analyse and compare the Intonational variations in Dharwada and Mangalooru dialects of Kannada in the Yes/No questions of ten native speakers of the dialects under study.

A total of 223 Yes/No questions elicited in a semi natural/simulated experimental condition using dyad pairs were collected. These 223 Yes No questions were analysed in two parts: Perceptual and Acoustic.

In the *perceptual analysis*, the Yes/No questions sharing common syntactic structures were chosen for further analysis in the study and the Primary stress (Nucleus) and Secondary stress in each of these questions were identified and marked by three judges. A total of 223 questions were analysed in the present study and on perceptual analysis by the judges, it was observed that only two levels of stress

(primary and secondary) were majorly present in the Yes/No questions in both the groups and the occurrence frequency of tertiary stress was very less. Similar findings were found for Mysooru - Bengalooru dialect of Kannada (Manjula, 1997). Thus, it may be inferred that all dialects of Kannada Yes No questions could probably be operating on two levels of stress i.e. primary and secondary.

Acoustic analysis of the Yes No questions was carried to analyse and compare the Intonation contours as a whole for contour shape, range, intonation groups and terminal contour; to extract acoustic features of Primary and Secondary stressed syllables; to study the F0 features of the questions and to analyse the temporal features of the Intonation contour, terminal word and terminal syllable.

In summary, the common features of intonation observed in the Yes No questions of Dharwada and Mangalooru dialects were as follows:

- Both the dialects showed two degrees (primary and secondary) of stress more prominently and tertiary stress occurrence was negligible.
- Both the dialects showed a terminal rising pattern for Yes/No questions.
- Rise-Fall-Rise or Fall-Rise pattern of intonation contour was observed in majority of the questions in both the groups
- Both the dialects showed a higher percentage of occurrence of inclination than declination for Yes No question, meaning that the Yes No questions have a rising intonation contour in most instances.
- In both the dialects, F0 did not serve as a primary cue in the perception of primary stress in Yes/No interrogatives.
- Both the groups showed a similar F0 range of approximately 65 Hz.

- The temporal features studied (duration of intonation contour, duration of terminal word and duration of terminal syllable) did not differ significantly across the two dialects.
- F0 peak occurred on any syllable of the utterance and not necessarily on the perceived stress syllables of the question in both the dialects
- On the whole, a particular question did not carry a common or stereotyped intonation contour and this was evident in both the groups.

Intonational features in the Yes No question contours which varied between the dialects were as follows:

- Dharwada and Mangalooru dialects vary significantly in intensity of stress patterns (primary and secondary) of Yes/No questions. For production of perceived stress, speakers of Dharwada dialect used higher intensity than speakers of Mangalooru dialect.
- Dharwada dialect showed a higher percentage of inclination than Mangalooru dialect.
- Speakers of Dharwada group showed higher pitch registers and they used raising pitch more often than the speakers of Mangalooru group.
- Mangalooru dialect showed higher occurrence of declination and showed distinct phrase boundaries/ Intonation groups
- Analysis of the stress patterns revealed that speakers of Mangalooru dialect did not use intensity as a cue to produce primary and secondary stress while Dharwada dialect speakers use higher intensity to produce Yes/No questions.
- In Dharwada dialect, males used a higher pitch at the beginning of the Yes/No questions while females used a higher pitch at the end of the question.

- On comparing the gradient of terminal word and terminal syllable, speakers of Dharwada group showed a higher pitch movement (sharper rise) in the terminal syllable while speakers of Mangalooru group showed rise across the terminal word.

There were commonalities as well as differences across the two dialects with respect to perceptual and acoustic features analysed in this study. The commonalities suggest the possibilities of a universal trend in Kannada language across dialects and the variations suggests the idiosyncratic trends within a dialectal group. These results can be taken as pointers to carry on further research on larger corpus to arrive at conclusions. Since, the present study employed a simulated experimental design and the sentences analysed were of shorter durations, the variations in the Intonation patterns between Dharwada and Mangalooru Kannada needs to be further analysed at Discourse level.

Limitations of the study:

- A simulated experimental design was used. The intonation patterns obtained may not be natural.
- Only Yes/No interrogatives were analysed in the study and not WH interrogatives.
- Most of the speech samples consisted of single intonation group and hence results may not be generalized to Yes No contours carrying multiple intonation groups.

Future Recommendations:

- Similar study needs to be carried out on Yes No questions occurring in different contexts such as reading, conversation etc to compare and conclude.
- The results need to be verified with other designs for other grammatical forms (WH interrogatives, different sentence types etc.) and at discourse level.
- Similar studies needs to be carried out in other dialects of Kannada like Bellary- Gulbarga dialect, Shivamogga-chitradurga and Karwara (Rajapurohit, 1982; Sridhar, 2007; Upadhyaya, 1976) dialect to establish the intonation in Kannada Language as a whole and to verify the concept of ‘Universality’ of languages for intonation (Cruttenden, 1997).

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APPENDIX 1

Dialect Proficiency Checklist (Kannada)

ಹೆಸರು: ಜಿಲ್ಲೆ: ದಿನಾಂಕ:
ವಯಸ್ಸು/ಲಿಂಗ: ಶಿಕ್ಷಣ:
ಊರು: ಮಾತೃಭಾಷೆ:

೧. ನೀವು ಯಾವ ಭಾಷೆಯಲ್ಲಿ ಪ್ರಾವೀಣ್ಯತೆ ಪಡೆದಿದ್ದೀರಿ?

ಭಾಷೆ	ಮಾತನಾಡಲು	ಬರೆಯಲು	ಓದಲು

೨. ನಿಮ್ಮ ಭಾಷೆಯ ಶೈಲಿ ಯಾವುದು?

ಮೈಸೂರು - ಬೆಂಗಳೂರು ಗುಲ್ಬರ್ಗ ಇತರೆ
ದಾರವಾಡ ಮಂಗಳೂರು

೩. ನೀವು ಕೆಳಗಿನ ಯಾವ ಭಾಷೆಯ ಶೈಲಿಗಳನ್ನು ಮಾತನಾಡಬಲ್ಲೀರಿ?

ಮೈಸೂರು - ಬೆಂಗಳೂರು ಗುಲ್ಬರ್ಗ ಇತರೆ
ದಾರವಾಡ ಮಂಗಳೂರು

೪. ನೀವು ಹುಟ್ಟಿದ್ದು ಯಾವ ಜಿಲ್ಲೆಯಲ್ಲಿ?

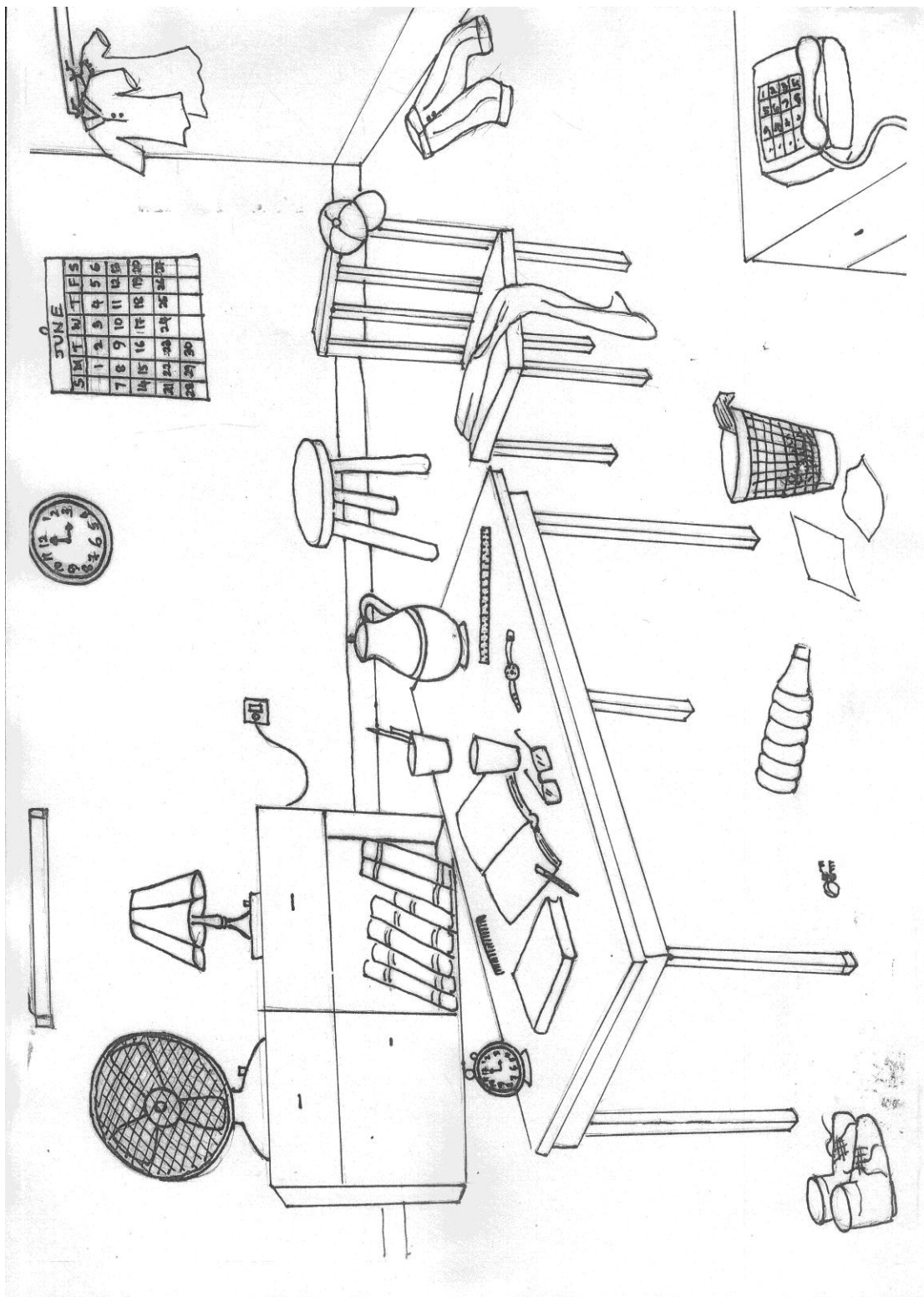
೫. ನೀವು ಬೆಳೆದಿದ್ದು ಯಾವ ಜಿಲ್ಲೆಯಲ್ಲಿ?

೬. ನೀವು ನಿಮ್ಮ ಜಿಲ್ಲೆ ಬಿಟ್ಟು ಬೇರೆ ಜಿಲ್ಲೆಯಲ್ಲಿ ವಾಸವಾಗಿದ್ದೀರಿ? ಹಾಗಿದ್ದರೆ ಎಷ್ಟು ಸಮಯ?

ವಯಸ್ಸು (ವರ್ಷಗಳು)	ಜಿಲ್ಲೆ	ವಾಸವಿದ್ದ ಸಮಯ
0 – 5		
5 – 10		
10 – 15		
15 -20		
>20		

APPENDIX 2

Picture card – Study Room



APPENDIX 3

Transcription of Sounds in Kannada Language Using *Schiffman's (1979)*

Vowel Sounds

		Frontal	Central	Back
<i>High</i>	Short	i		u
	Long	ii		uu
<i>Mid</i>	Short	e		o
	Long	ee*(ae)		oo
<i>Low</i>	Short		a	
	Long		aa	

Diphthongs: "ai" and "au"

Consonant Sounds

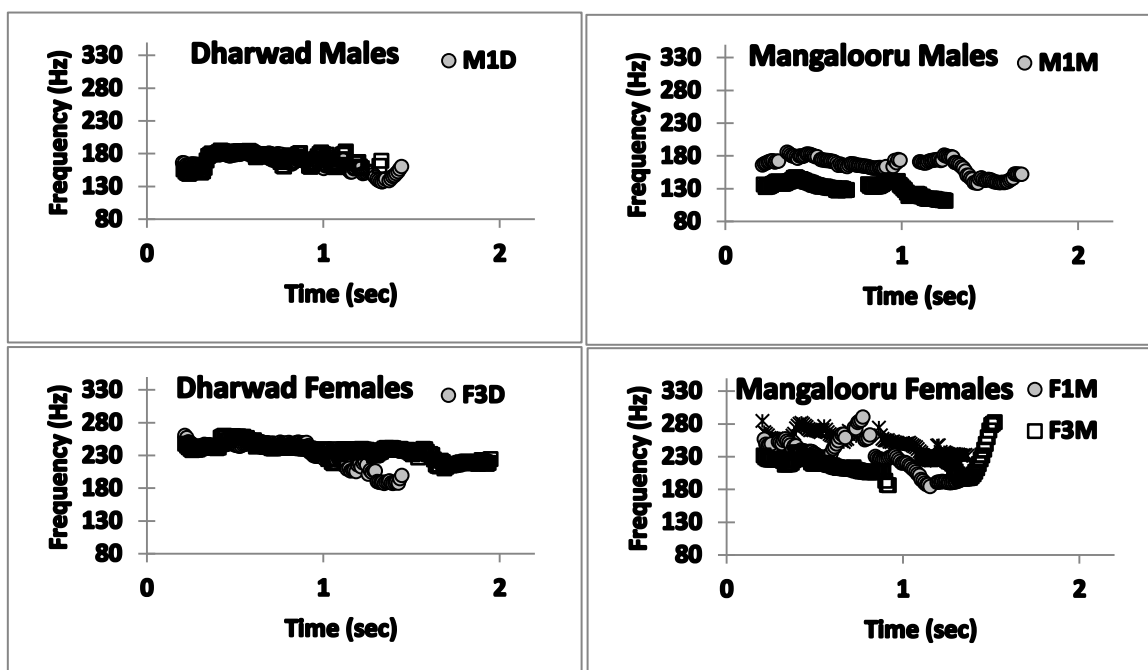
	Unaspirated	Aspirated	Unaspirated	Aspirated	Nasals
Velar	k	kh	^g	gh	
Palatal	c	ch	^j	jh	
Retroflex	T	Th	D	Dh	N
Dental	t	th	d	dh	n
Lateral	^p	ph	b	bh	m

	Glides		Sibilants		Fricatives		Laterals		Contnuant	
	V	UV	V	UV	V	UV	V	UV	V	UV
Pharyngeal						h				
Retroflex		S					L			
Apicopalatal	y	sh								
Alveolar		s	z				l			
labiodental	v		f							

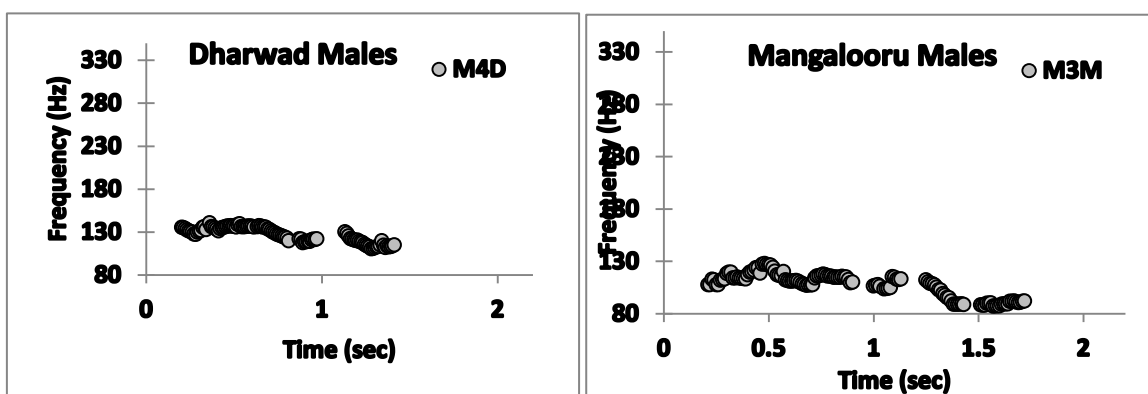
Note: V – Voiced and UV – Unvoiced or Voiceless

APPENDIX 4

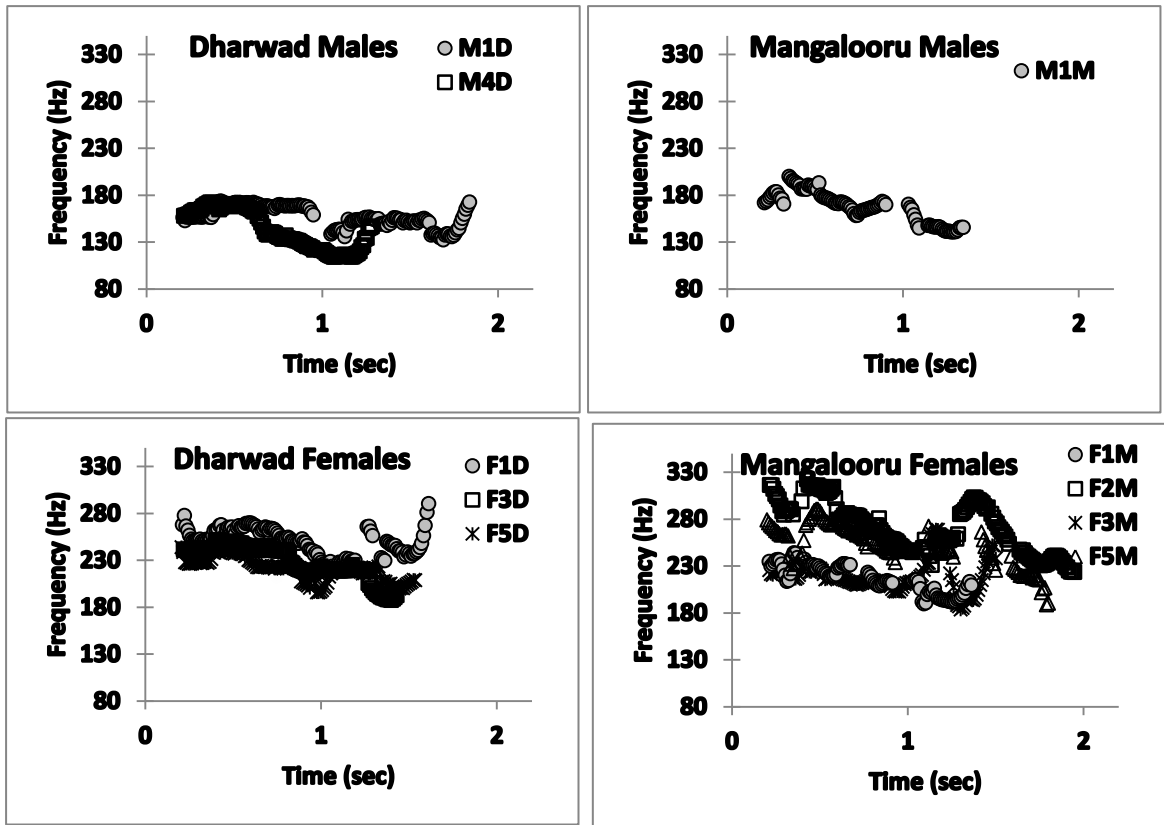
1. /Teebal meelee foon idiya/?



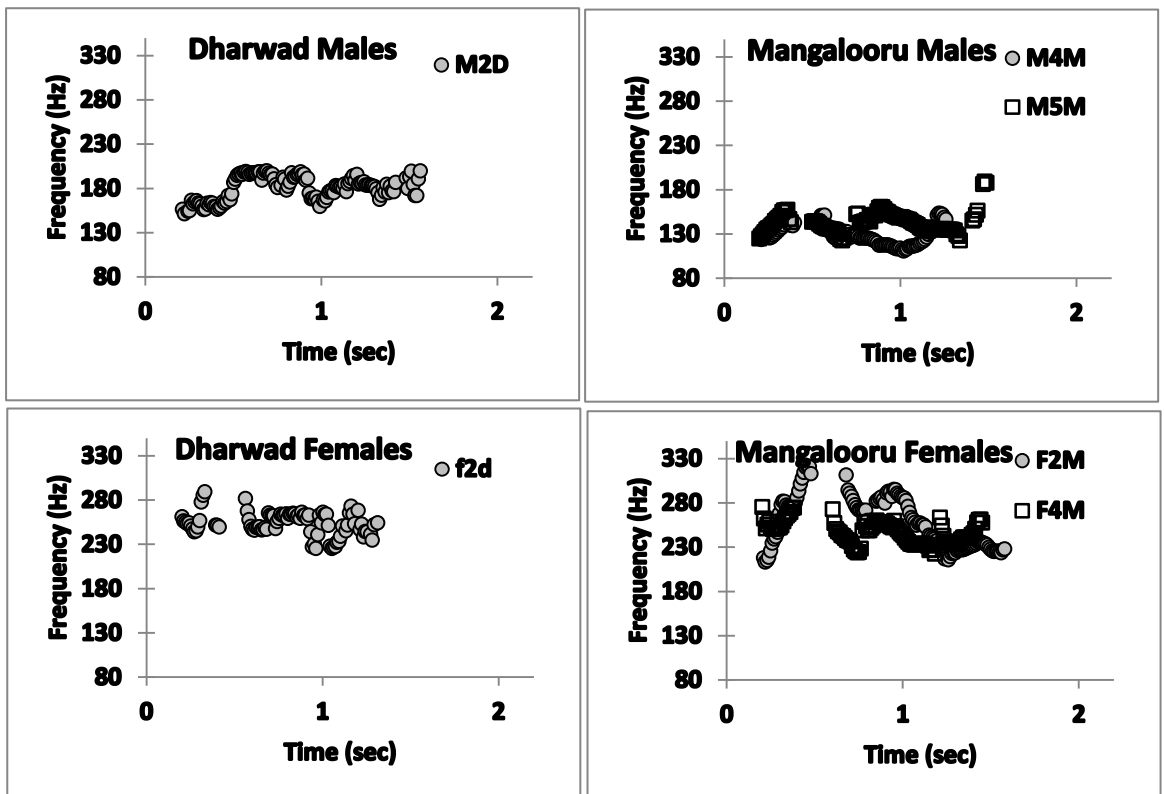
2. / Teebal meelee Telifoon idiya/?



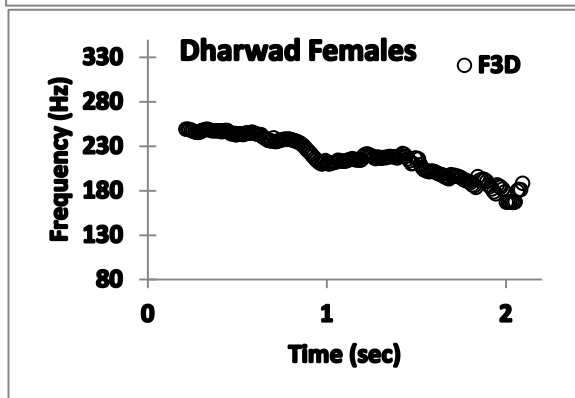
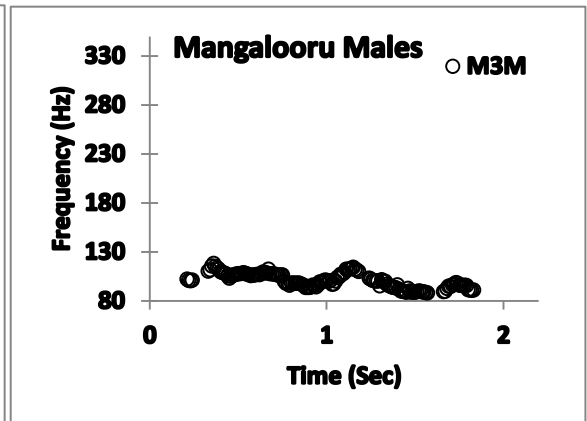
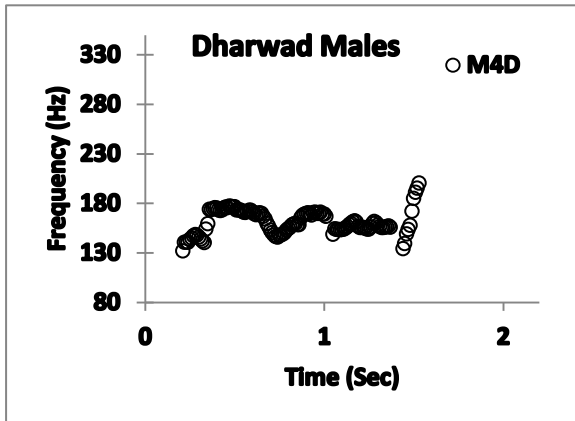
3. /Teebal meele gaDiyaara idiya/?



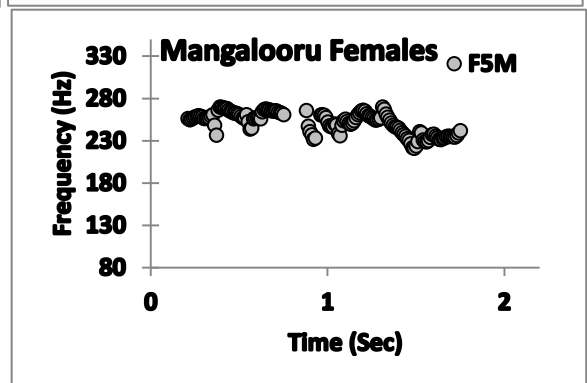
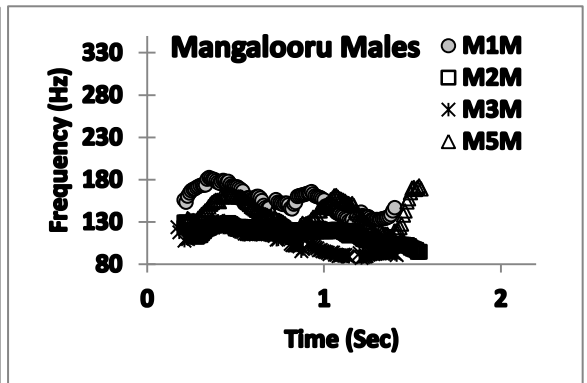
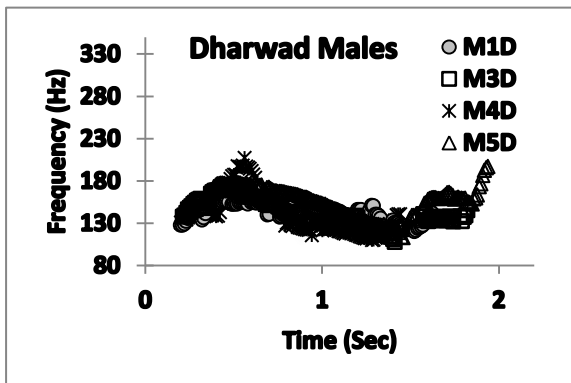
4. /vaac Teebal meel idiya/?



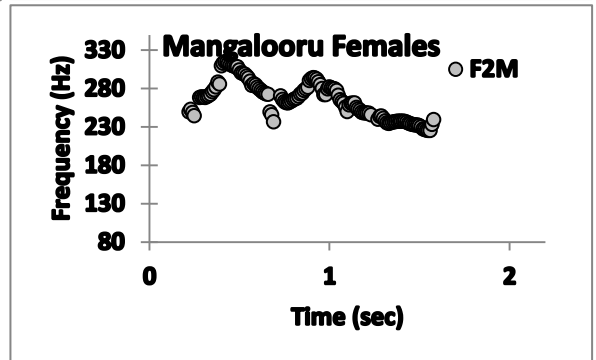
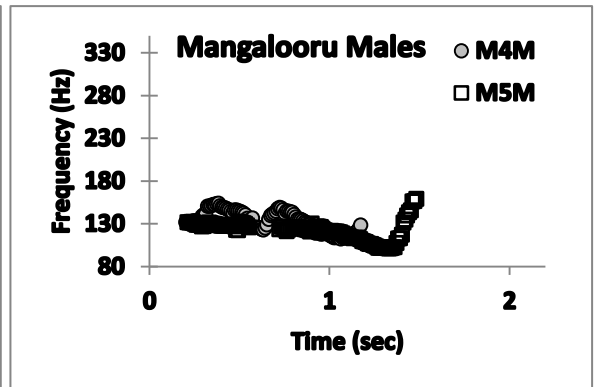
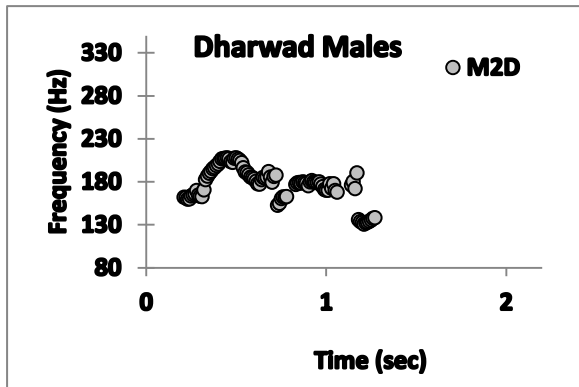
5. /Teebal meele alaaram gaDiyaara idiya/?



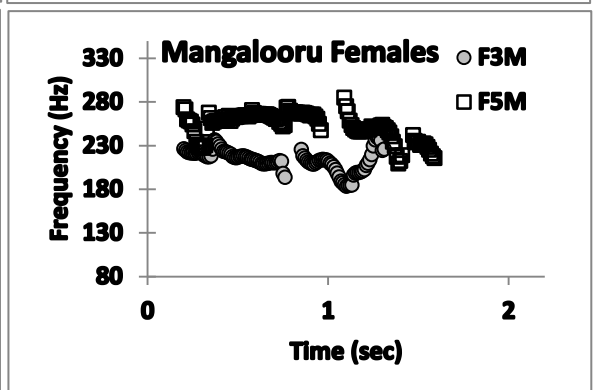
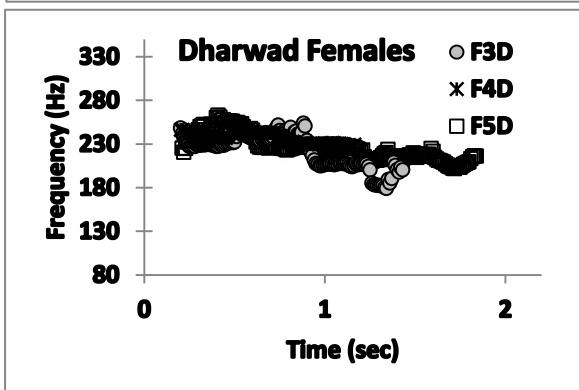
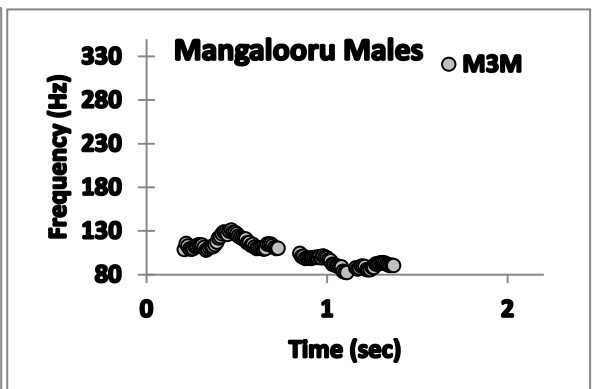
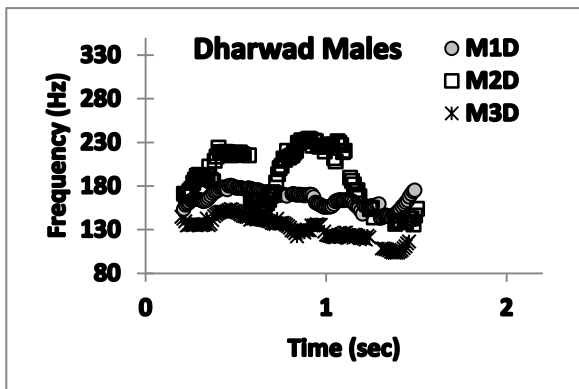
6. /gooDe meele gaDiyaara idiya/?



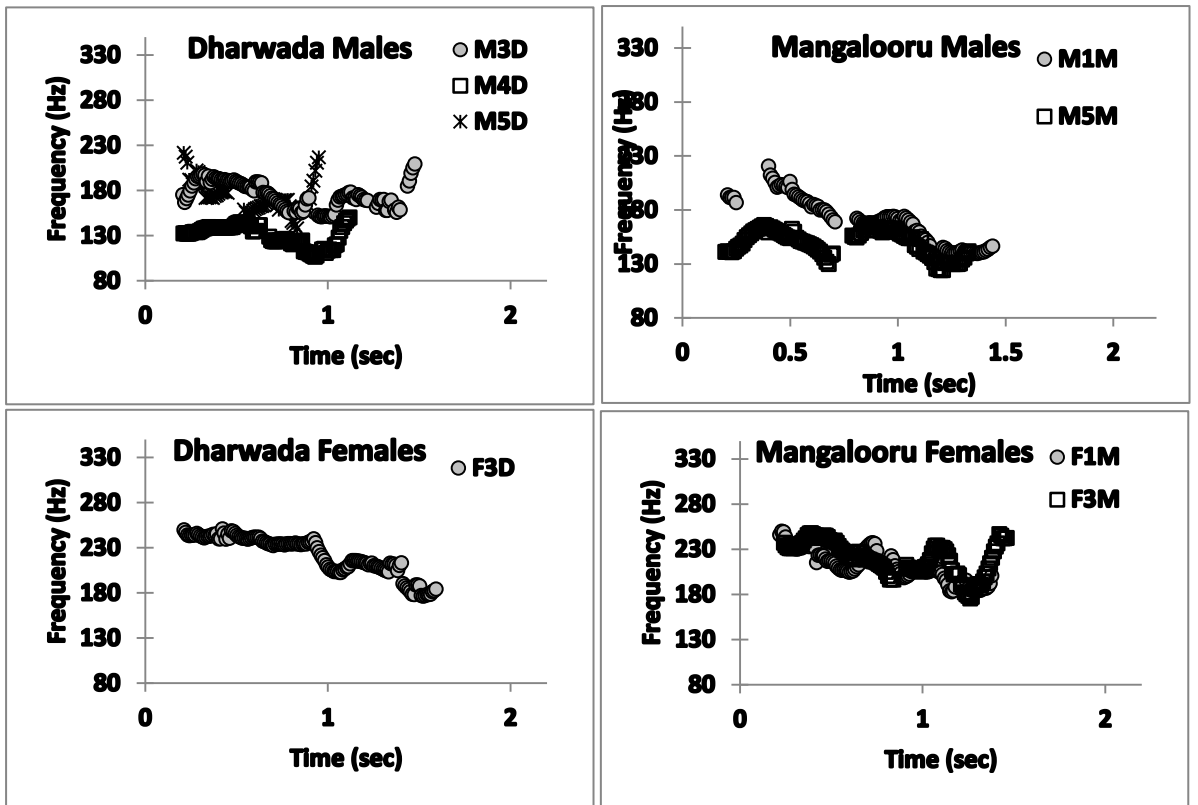
7. /gaDiyaara gooDe meel idiya/?



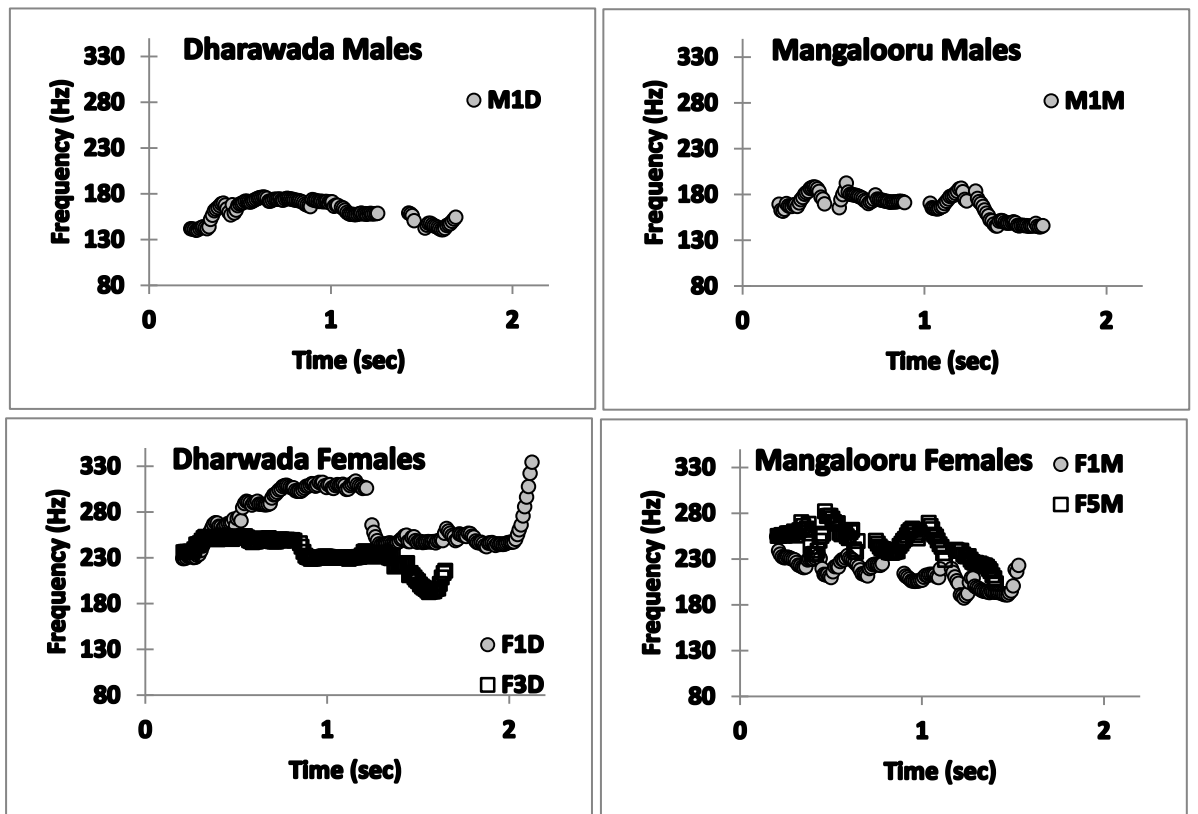
8. /Teebal meelee fyaan idiya/?



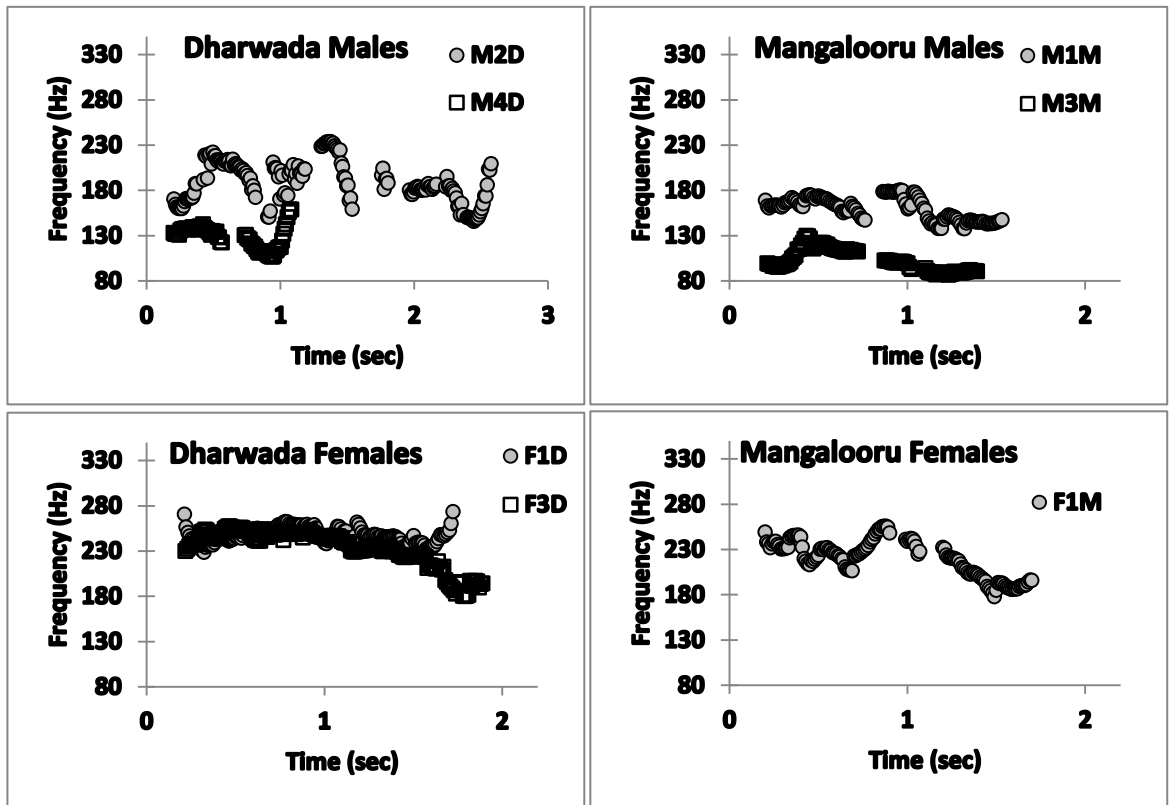
9. /ceer meelee Taval idiya/?



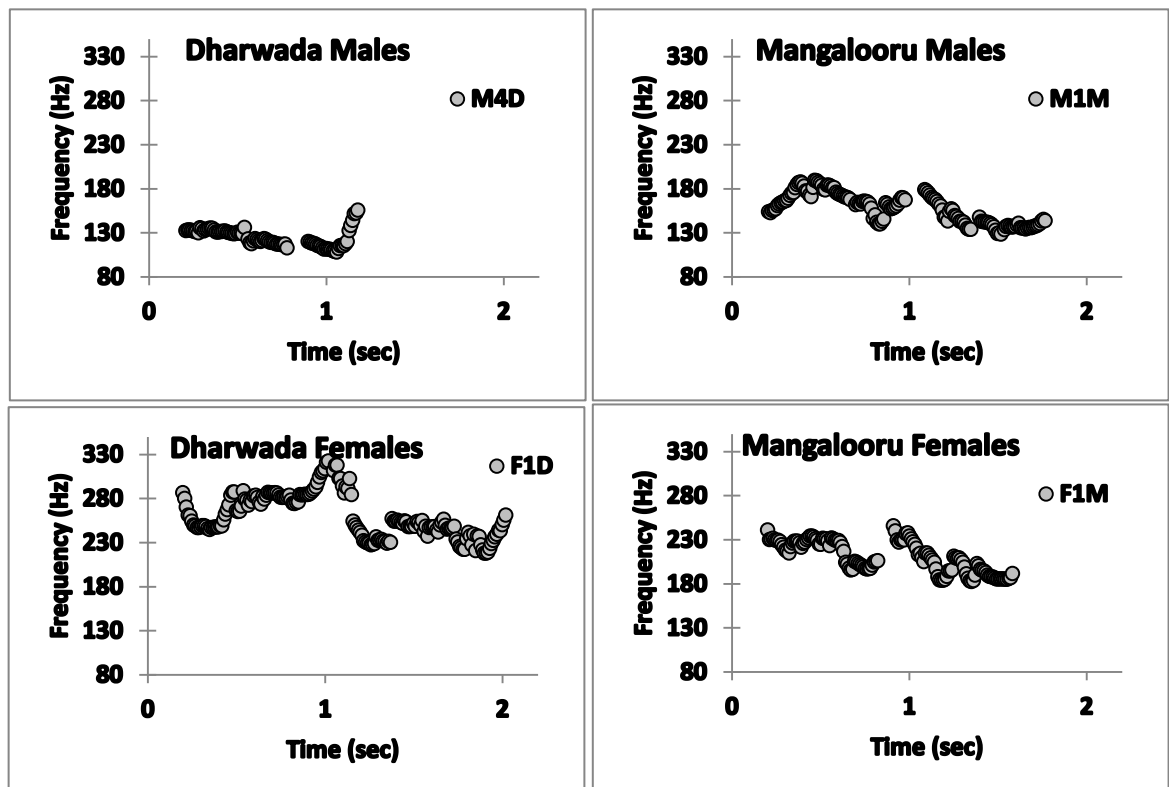
10. /nelaD meelee pyanT idiya/?



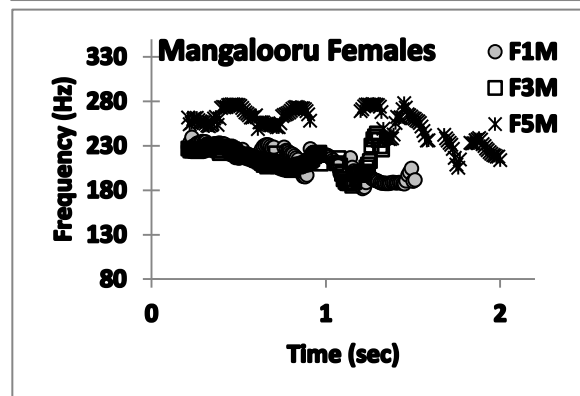
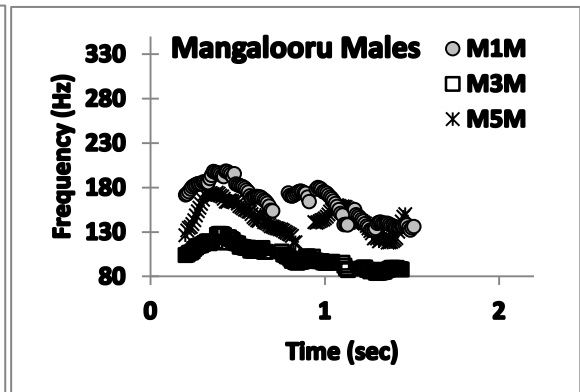
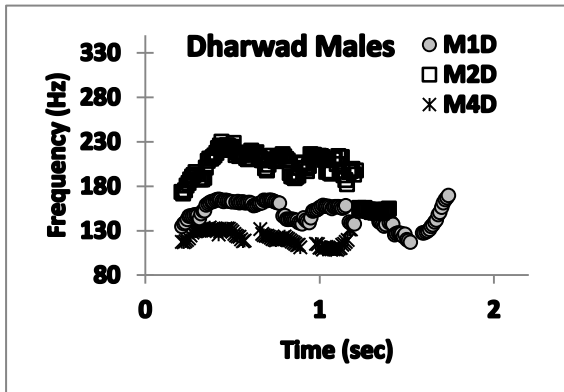
11. /nelad meeLe kii idiya/?



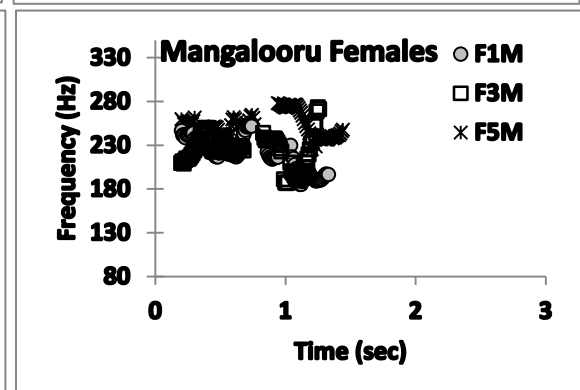
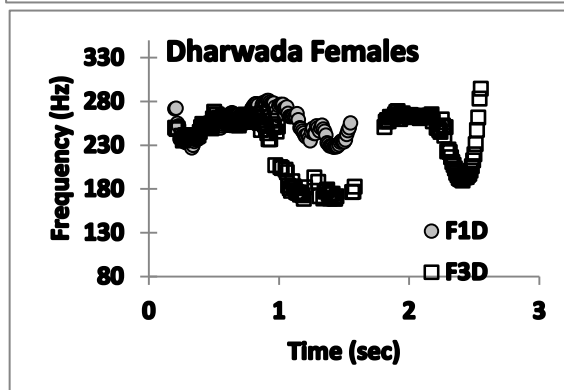
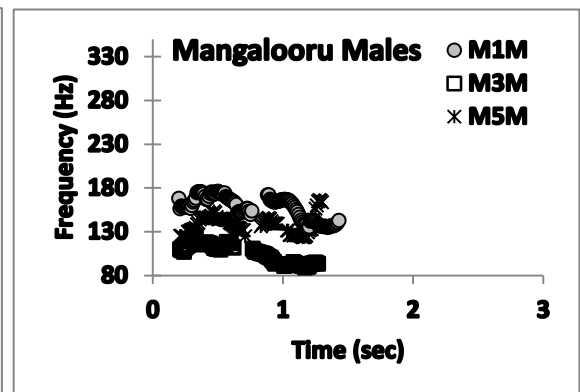
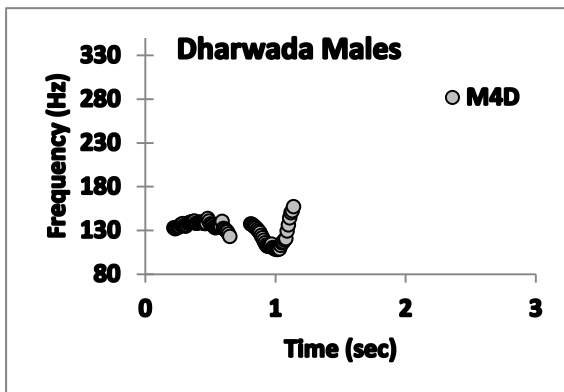
12. /nelad meeLe boTTal idiya/?



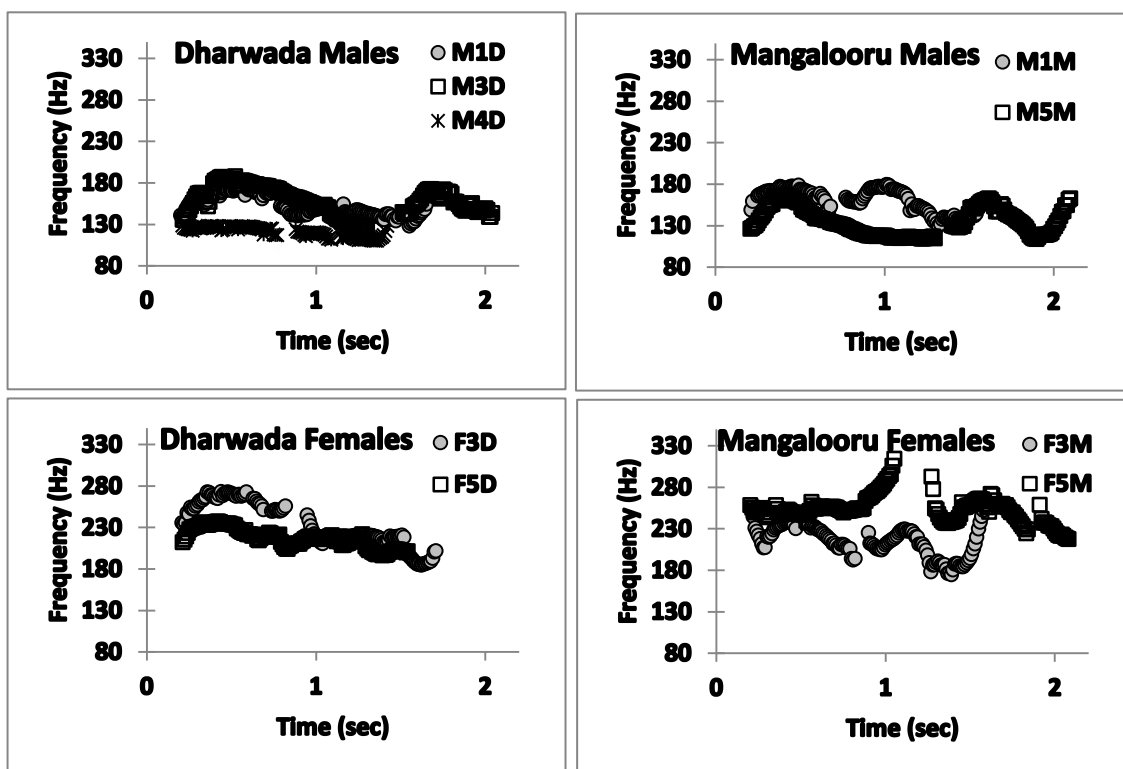
13. /gooDe meeLe TyuublaiT idiya/?



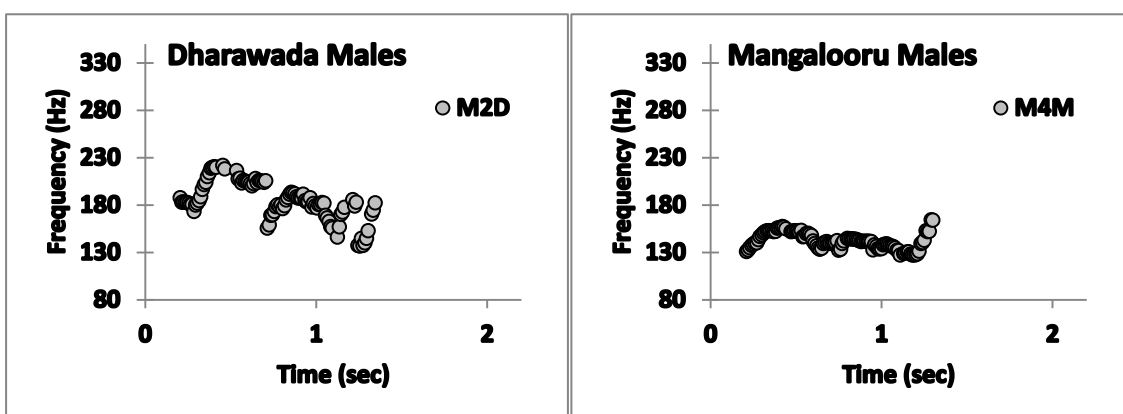
14. /nelad meeLe shuus idiya/?



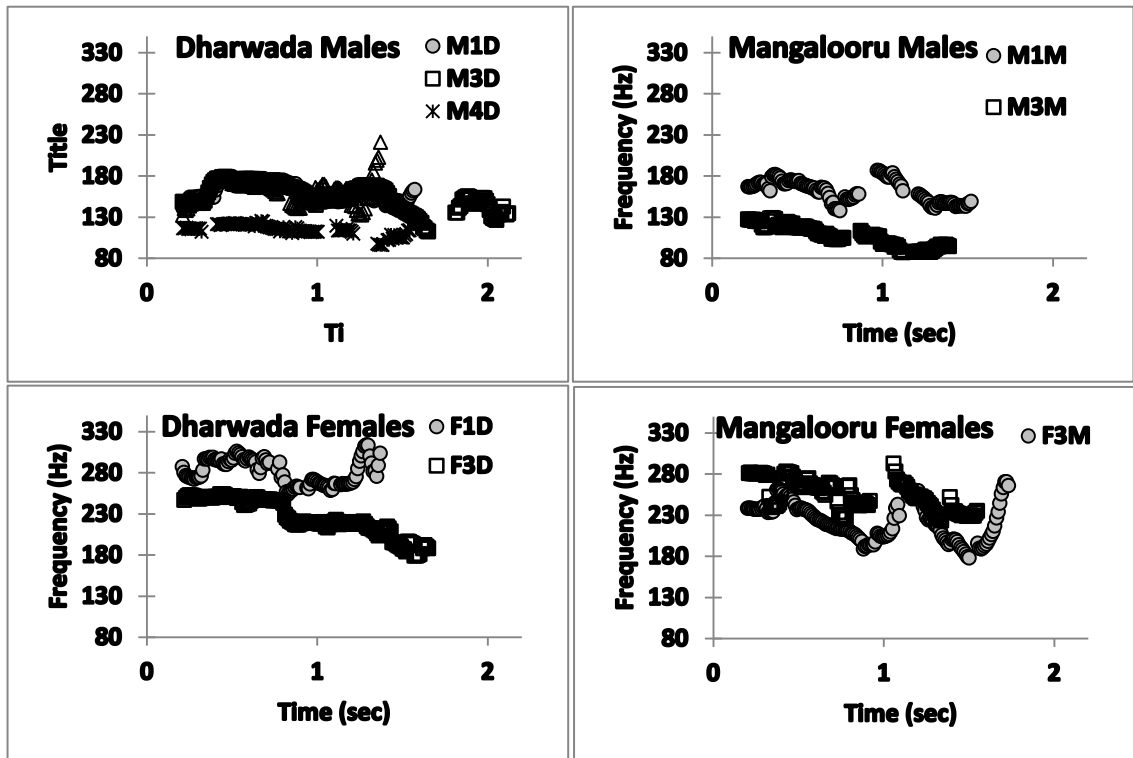
15. /gooDe meeLe kyaleNDar idiya/?



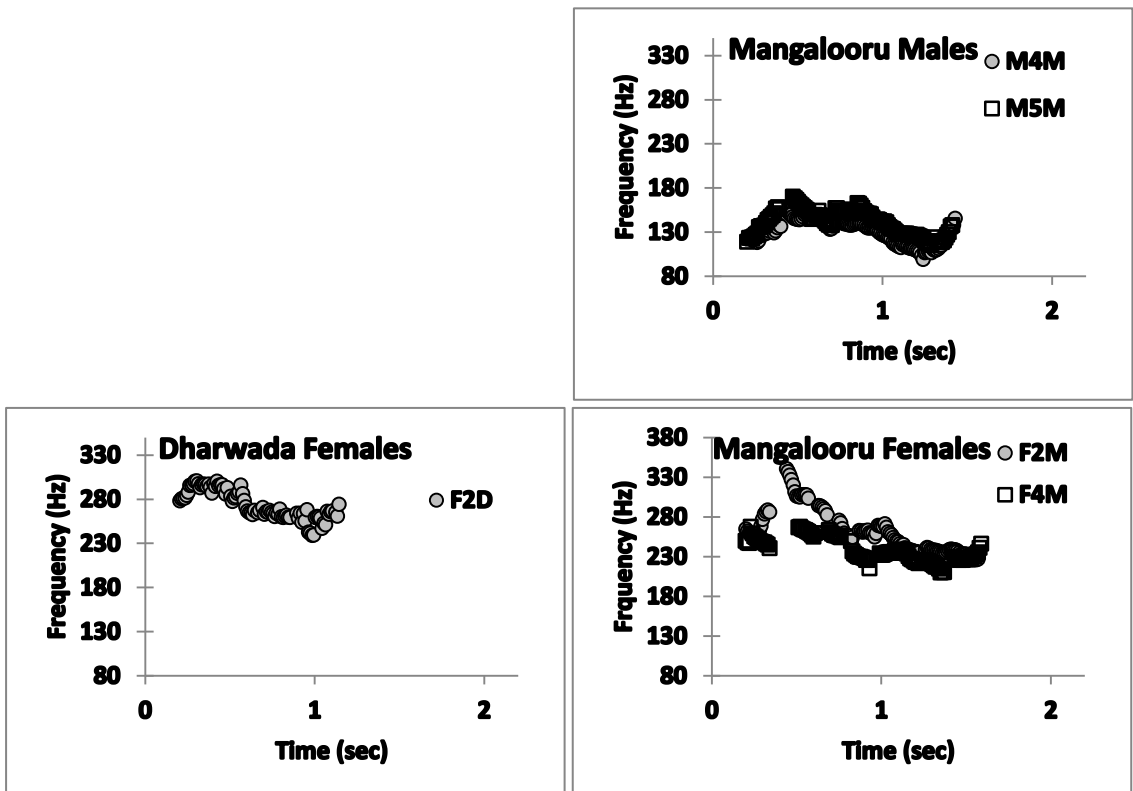
16. /kyaleNDar gooDe meel idiya/?



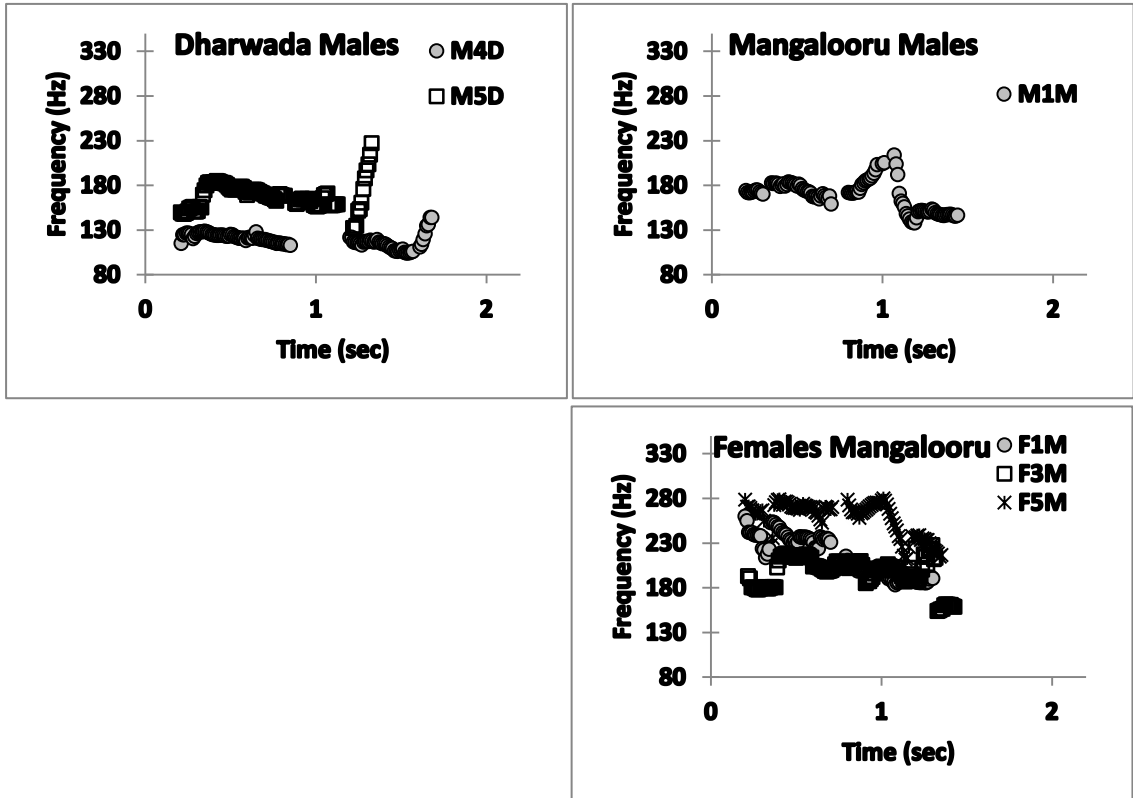
17. /Teebal meele baacaNige idiya/?



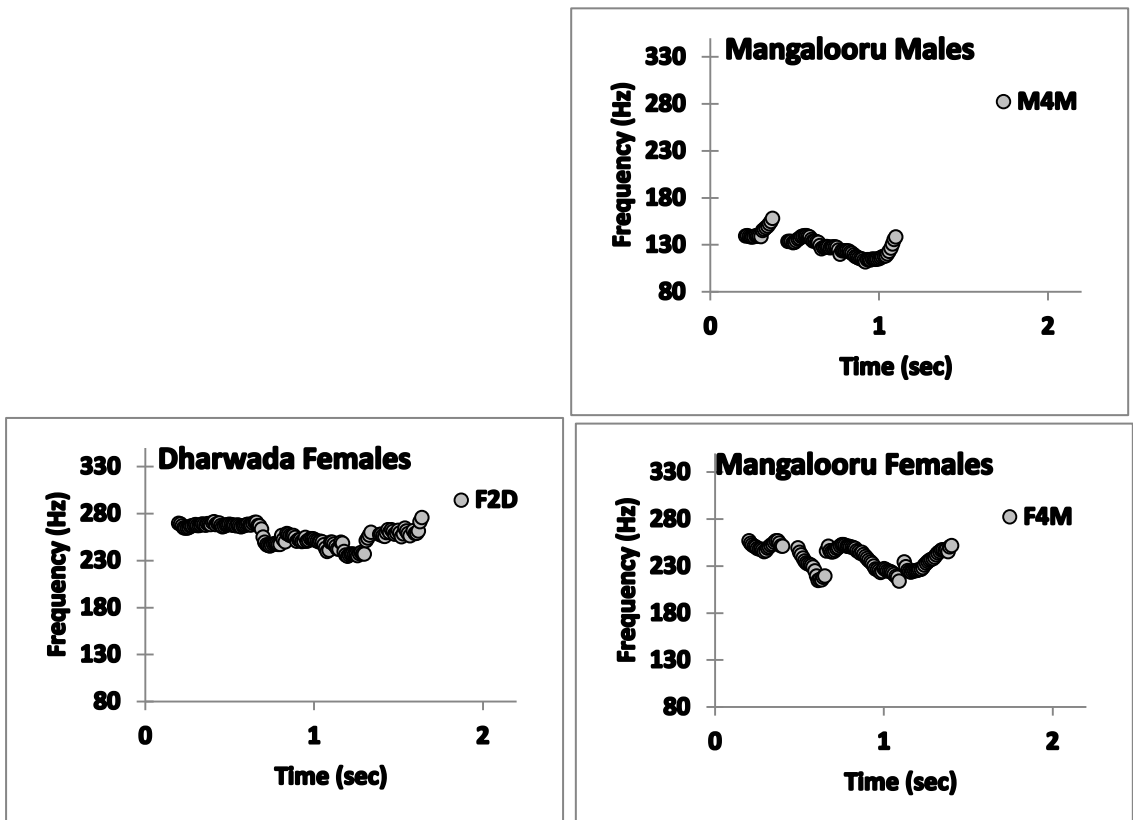
18. /baacaNige Teebalmeel idiya/?



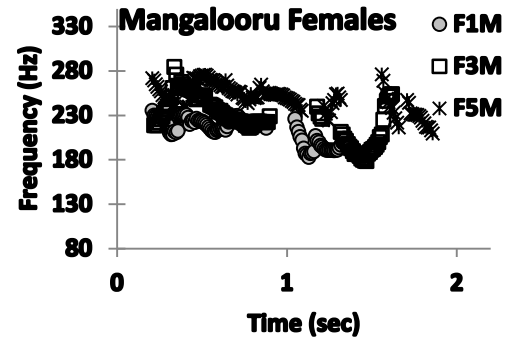
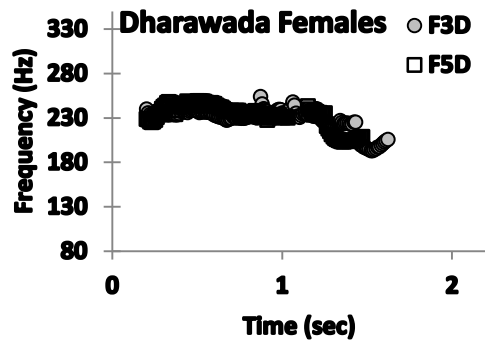
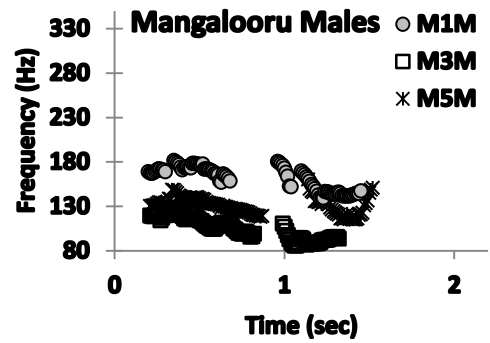
19. /Teebal meelee pen idiya/?



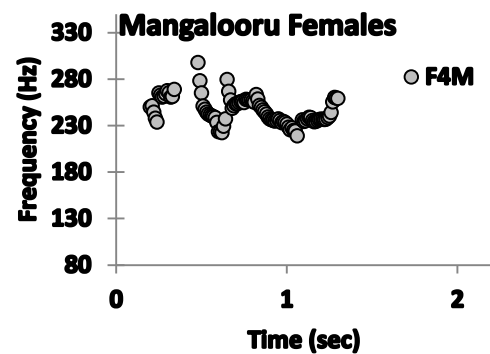
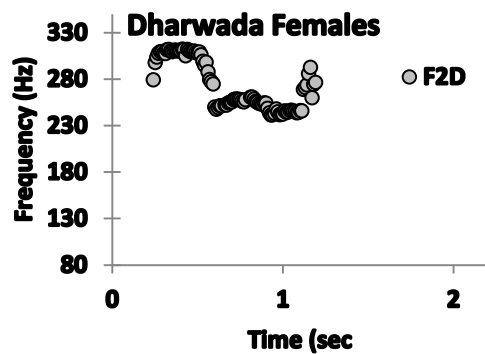
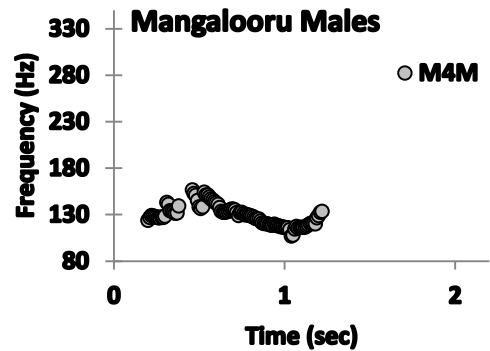
20. /pen Teebal meel idiya/?



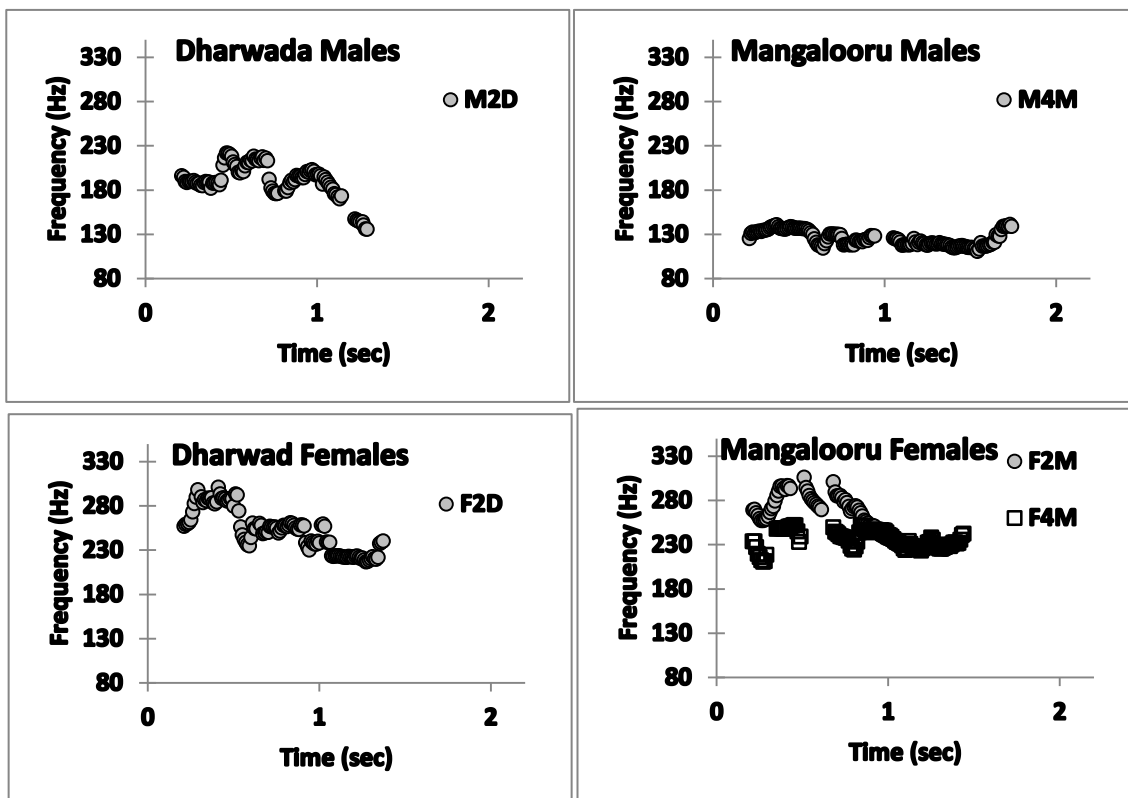
21. /Teebal meelee buks idiya/?



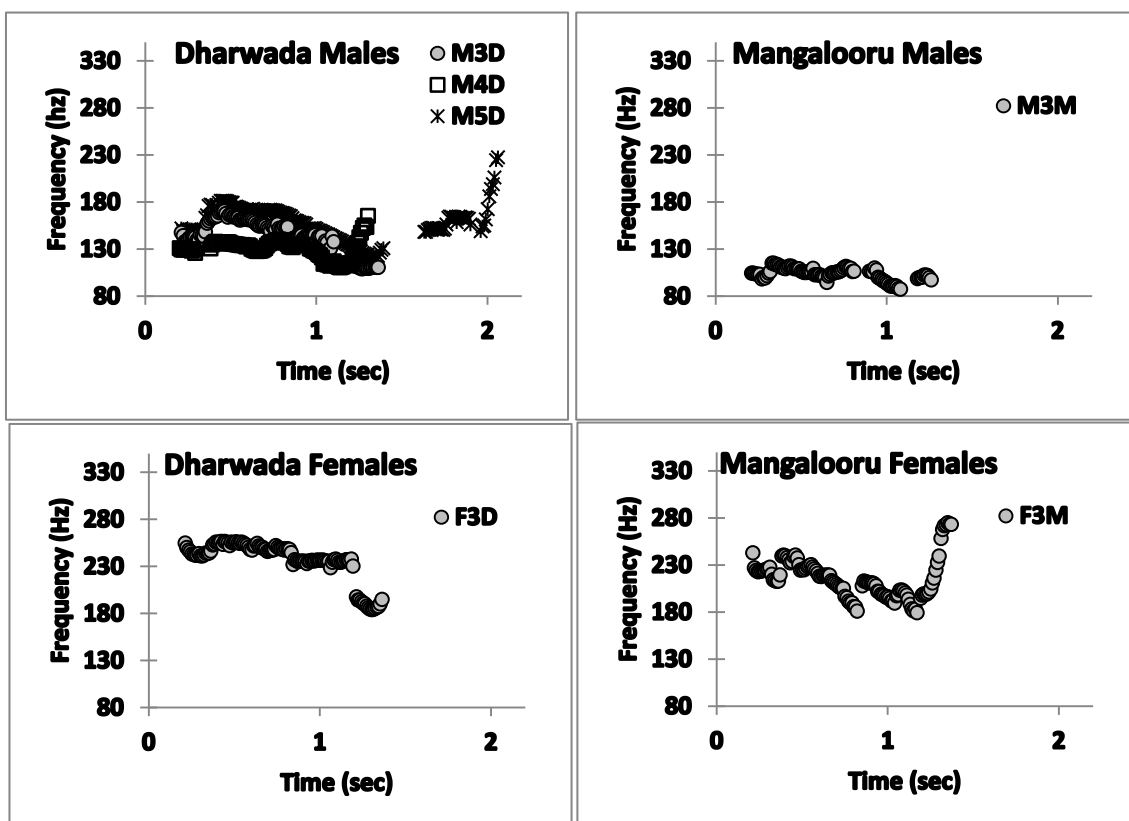
22. /buk Teebal meel idiya/?



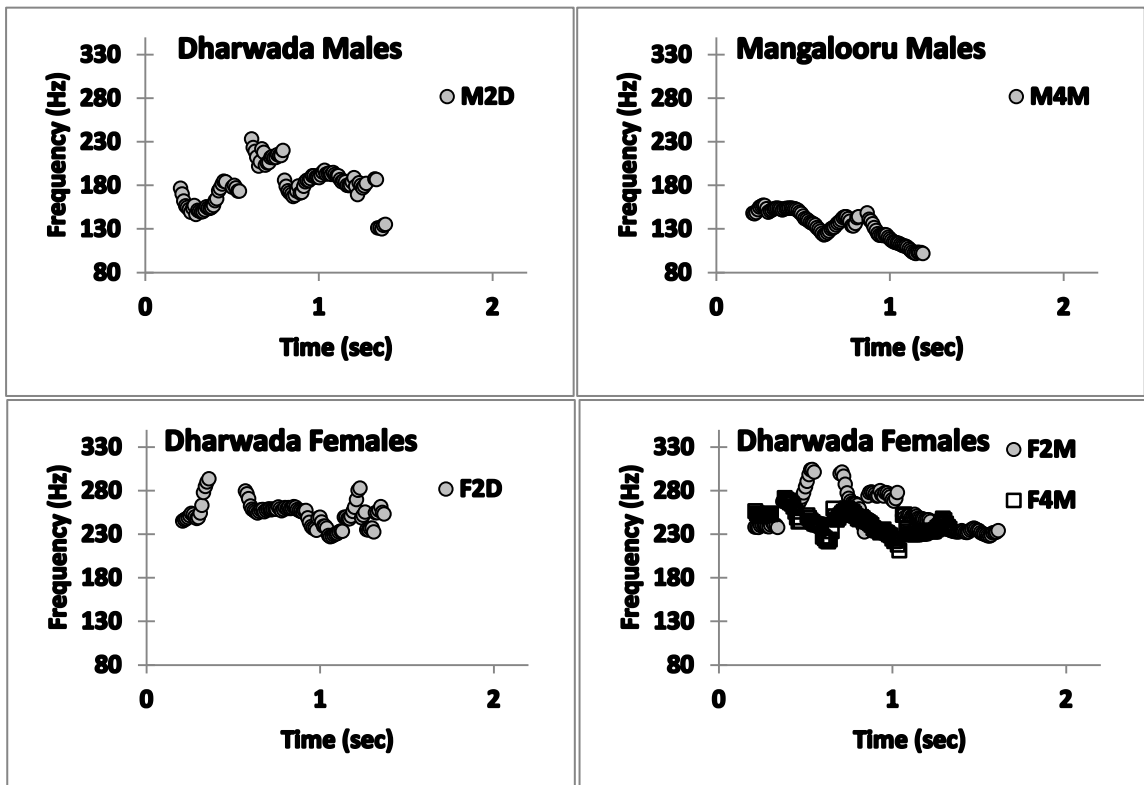
23. /jag Teebal meel idiya/?



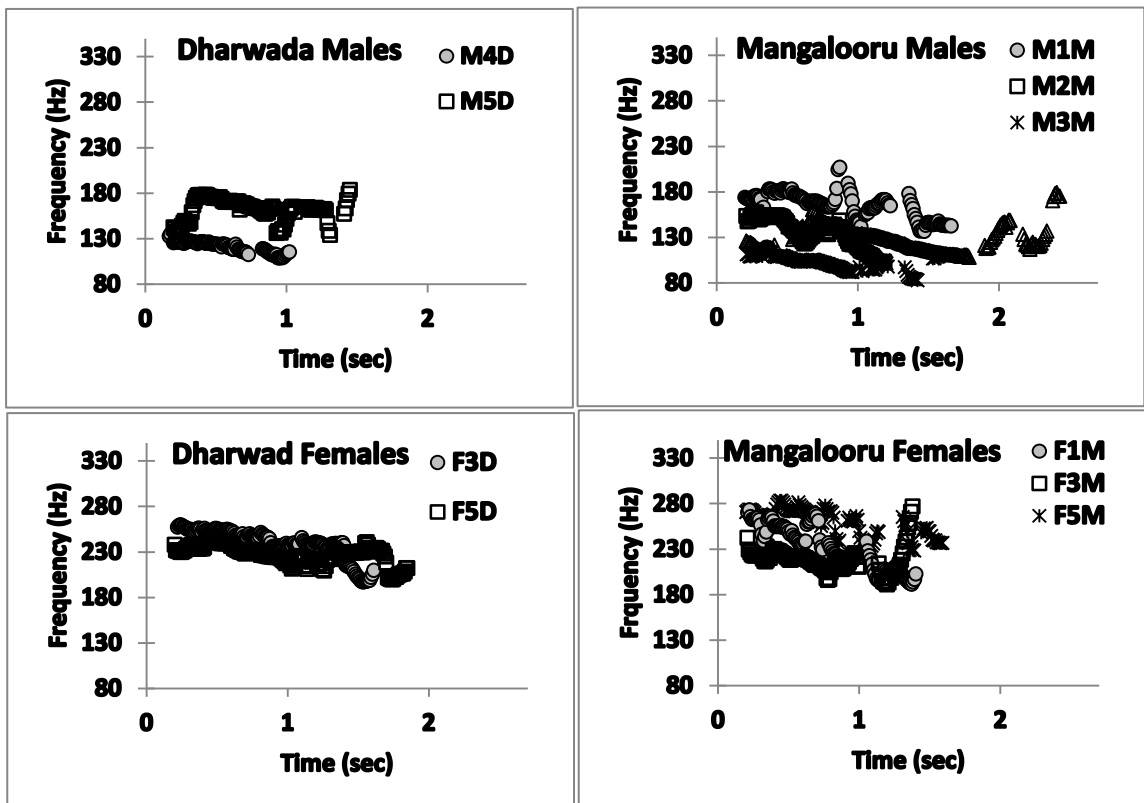
24. /Teebal meele jag idiya/?



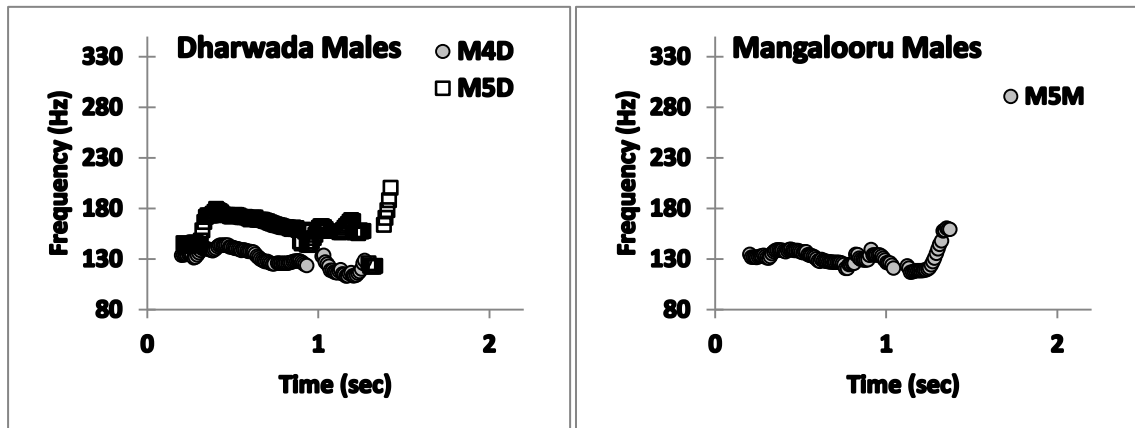
25. /glaas Teebal meel idiya/?



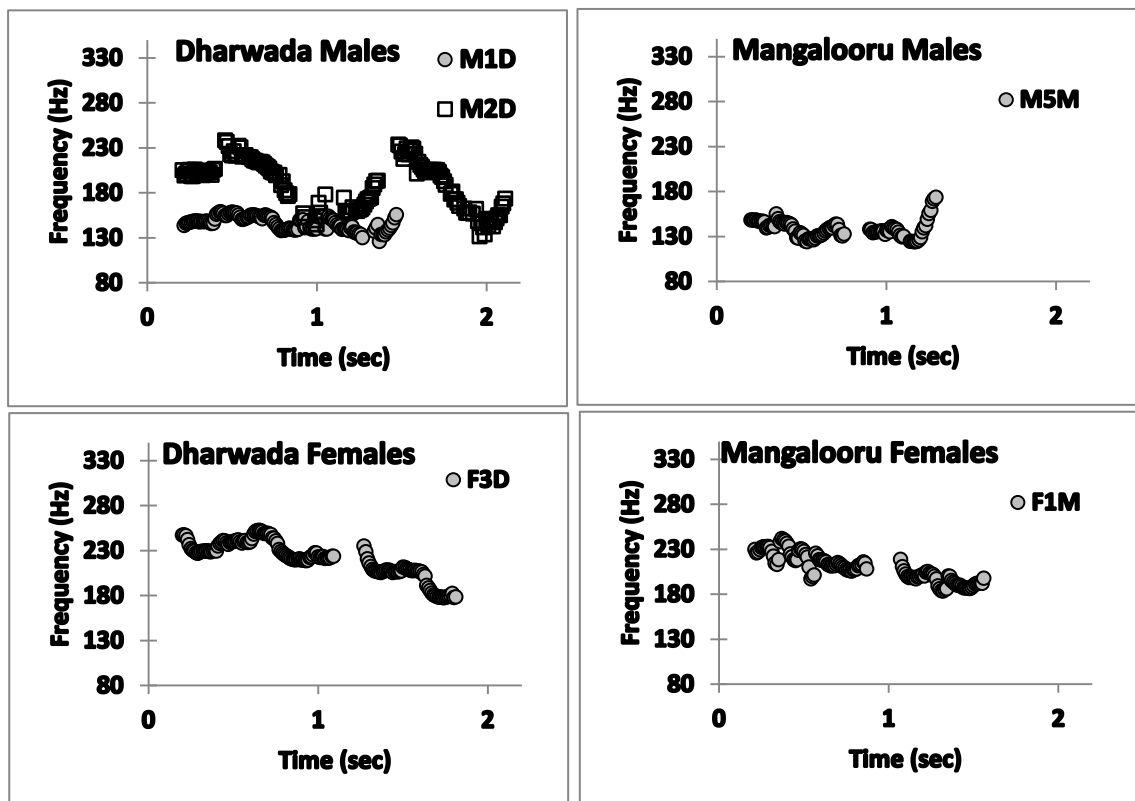
26. /Teebal meelee glaas idiya/?



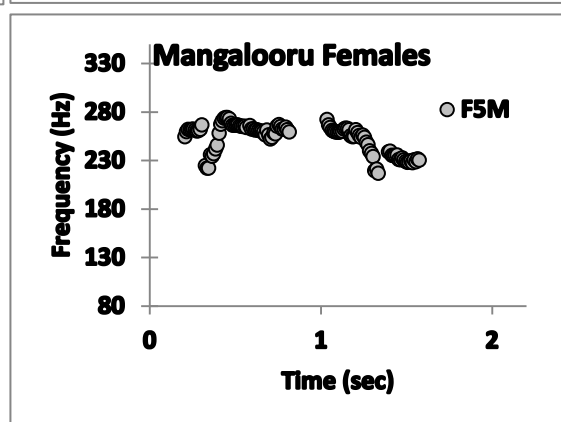
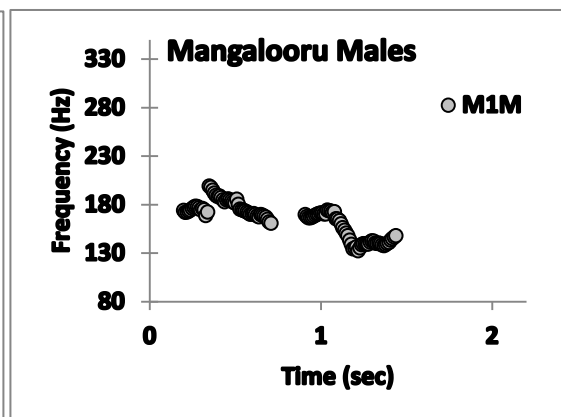
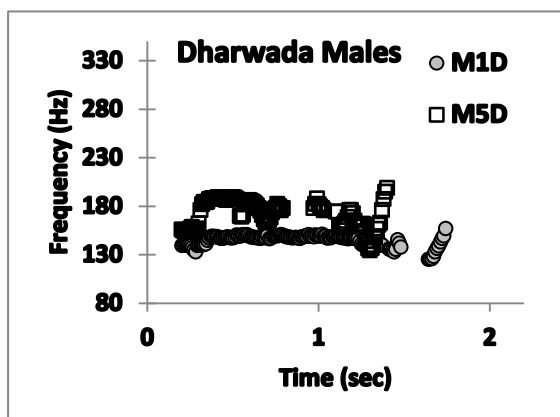
27. /Teebal meele lyamp idiya/?



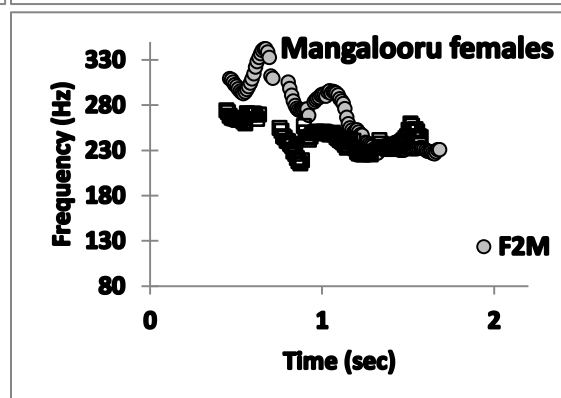
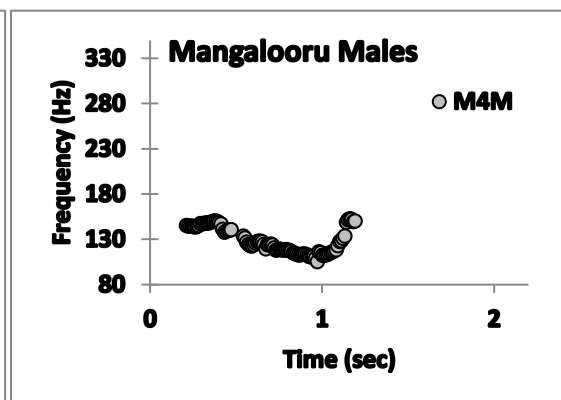
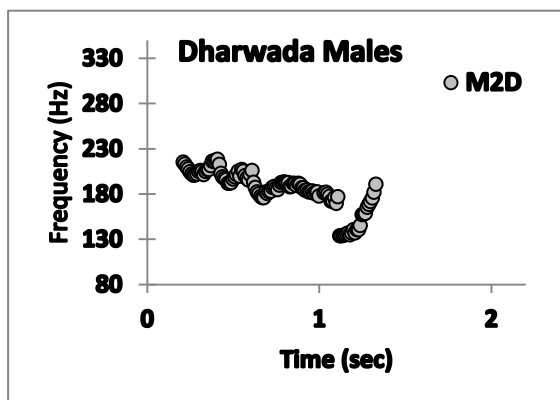
28. /Teebalge naalku kaal idiya/?



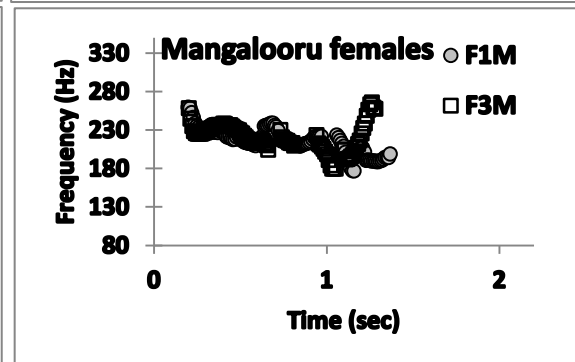
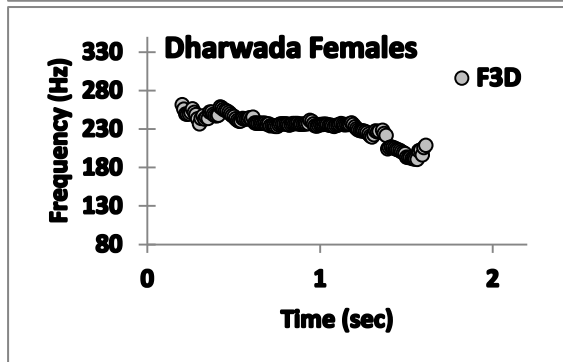
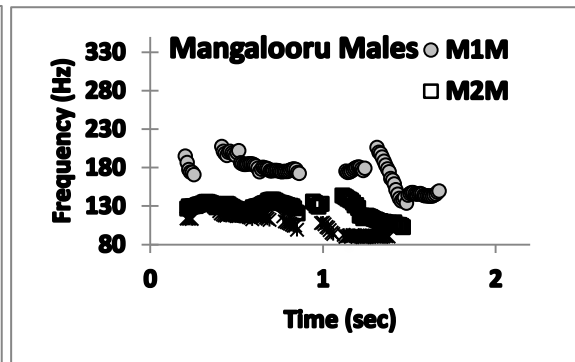
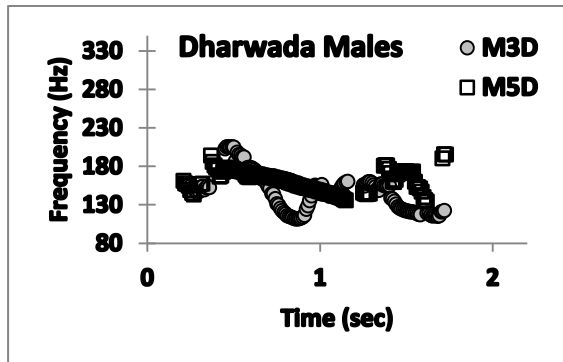
29. /Teebal meele skeel iTTidaara/?



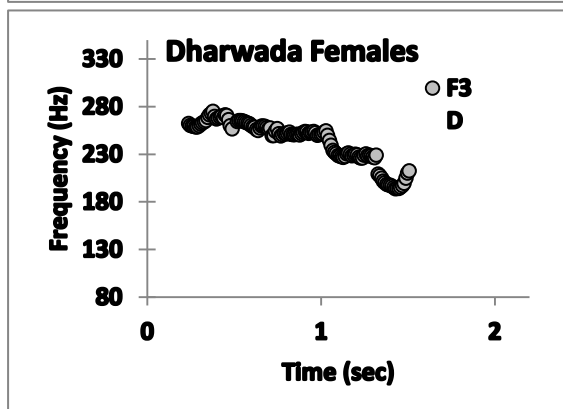
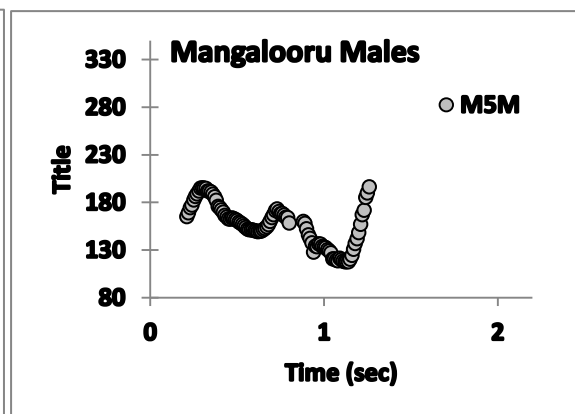
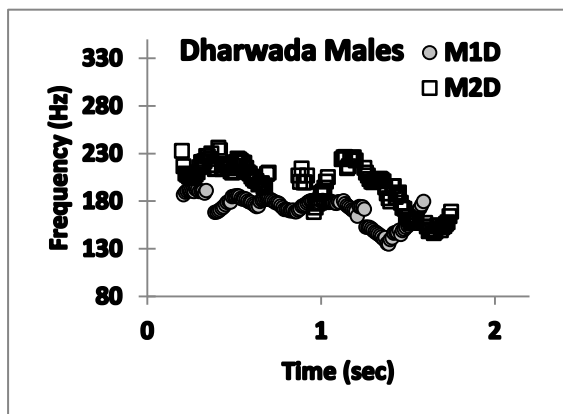
30. /skeel Teebal meel idiya/?



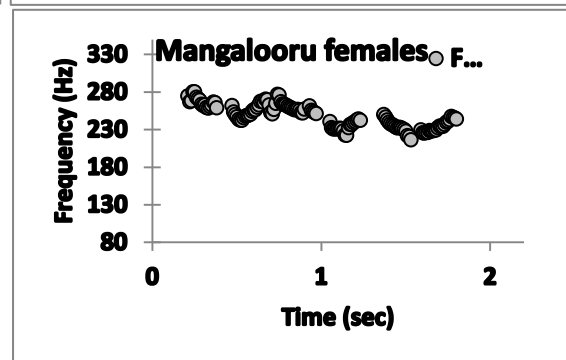
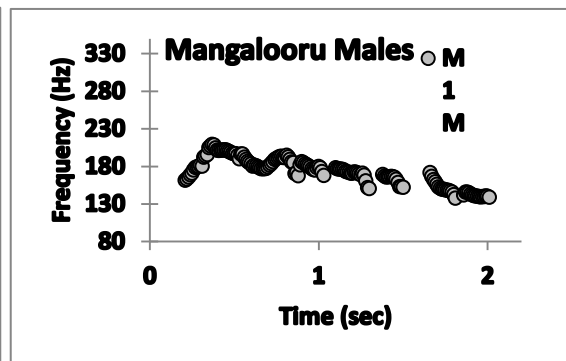
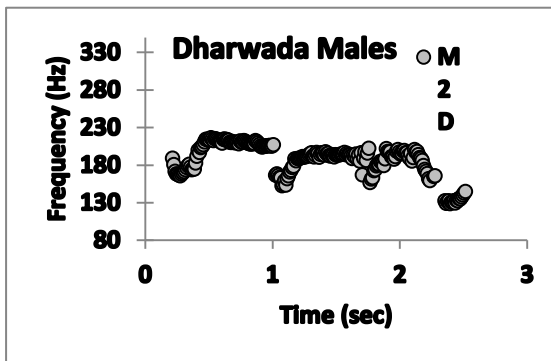
31. /kurci meele Topi idiya/?



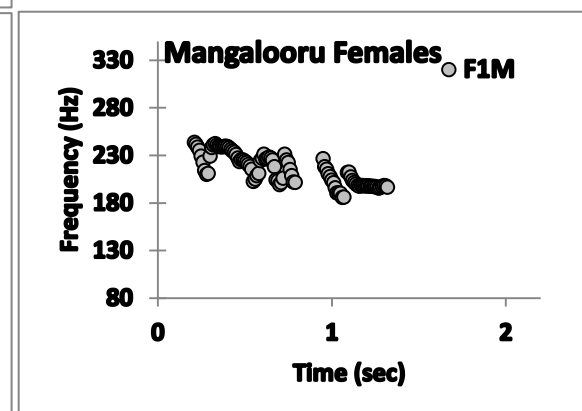
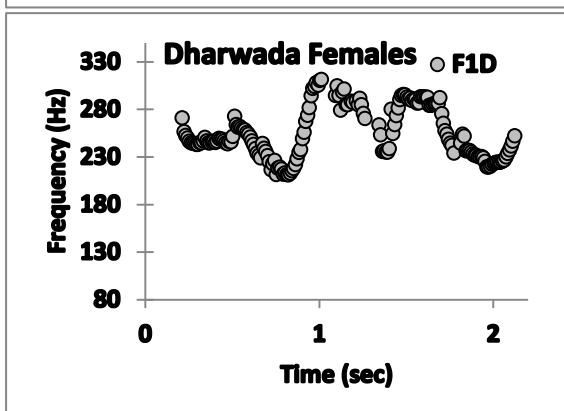
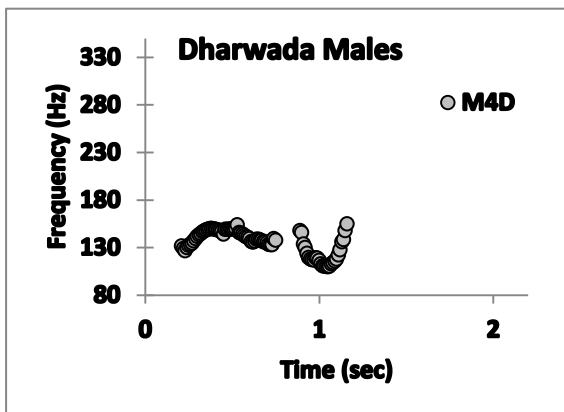
32. /sTuulige muuru kaal idiya/?



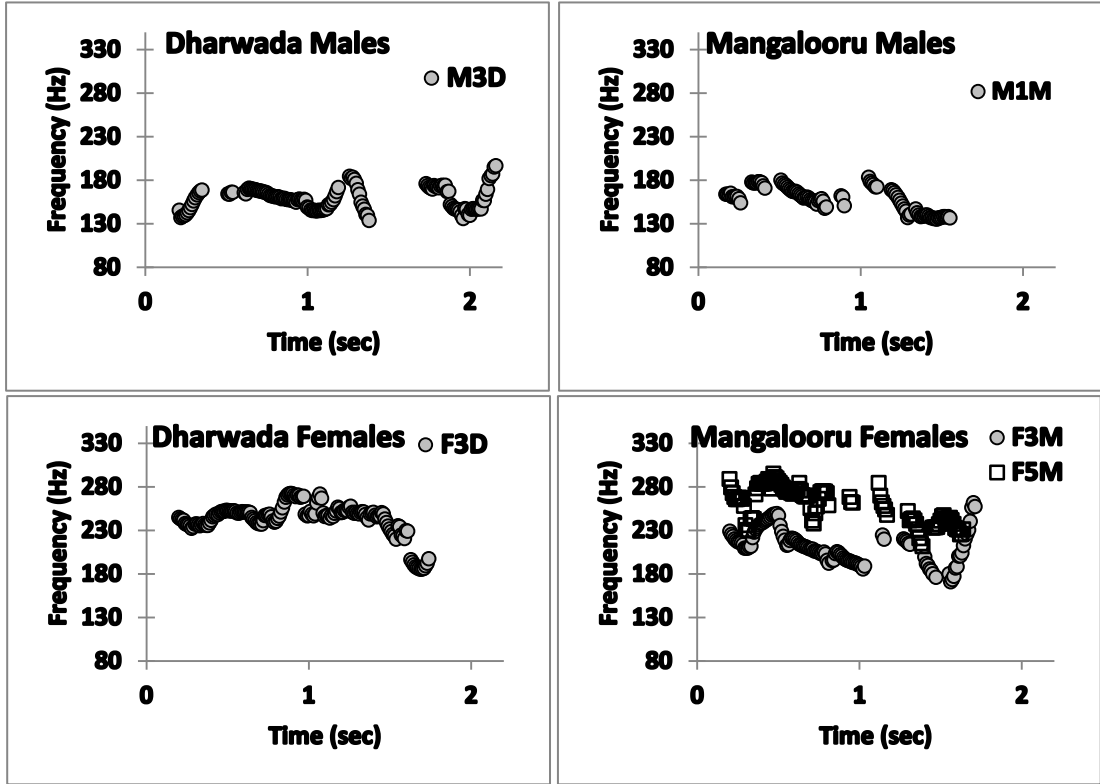
33. /klok muur ganTe toorista/?



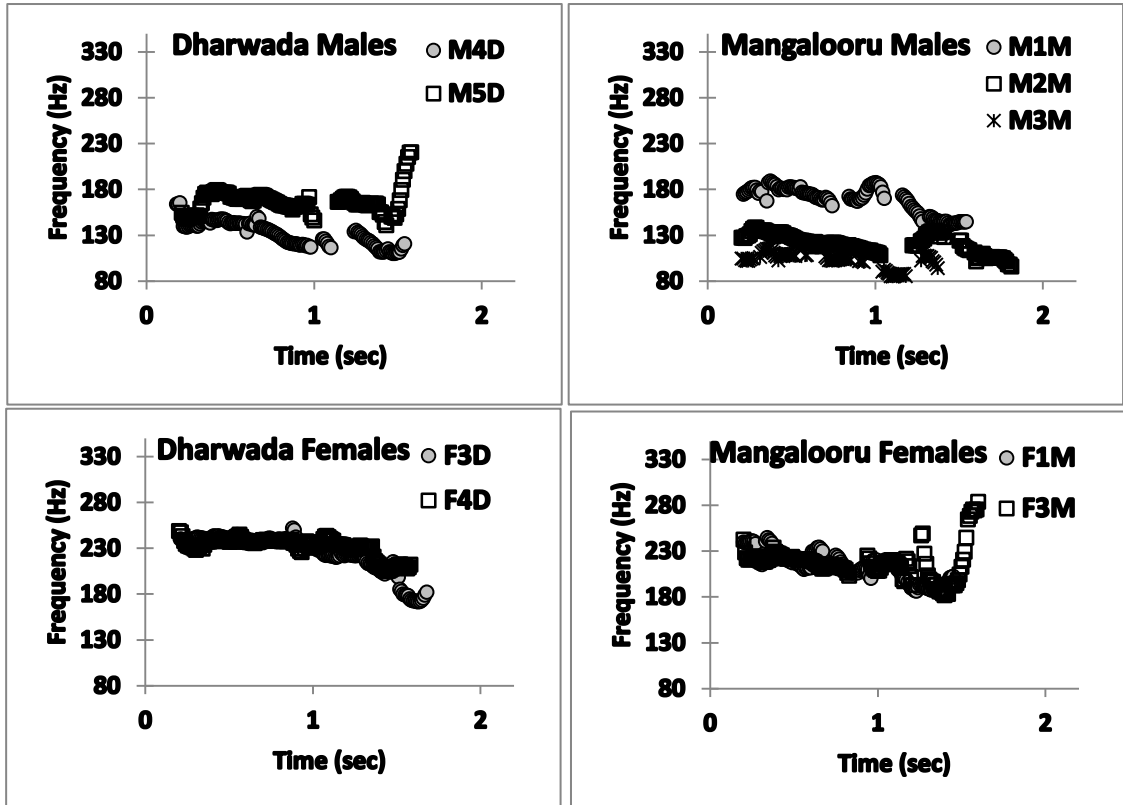
34. /shalfnalli buks idiya/?



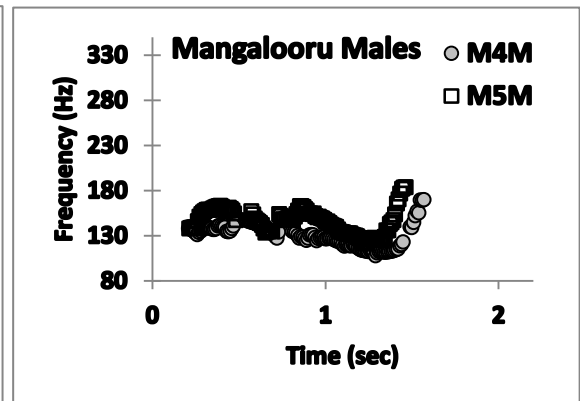
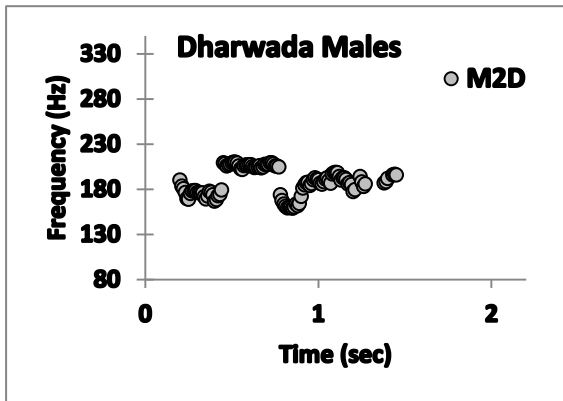
35. /kaborDnalli pusTaka idiya/?



36. /Teebal meeLe kaNNaDka idiya/?



37. /kaNNaDaka Teebal meele idiya/?



38. /nelad meele DasTbin idiya/?

