

**EFFECT OF DIALECTICAL VARIATIONS OF KANNADA ON  
AUDITORY-PERCEPTION OF VOCAL EMOTIONS**

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**University of Mysore**



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**JULY 2024**

## CERTIFICATE

This is to certify that the dissertation entitled “**Effect of Dialectical Variations of Kannada on Auditory-Perception of Vocal Emotions**” is a bonafide work submitted as a part of the fulfilment for the degree of Master of Science (Speech Language Pathology) of the student with registration number P01II22S123024. It has been carried out under the guidance of a faculty of this institution and has not been submitted earlier to any other university for the award of any diploma or degree.

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## CERTIFICATE

This is to certify that the dissertation entitled “**Effect of Dialectical Variations of Kannada on Auditory-Perception of Vocal Emotions**” has been prepared under my supervision and guidance. It is also being certified that this dissertation has not been submitted earlier to any other university for the award of any diploma or degree.

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## DECLARATION

This is to certify that the dissertation entitled “**Effect of Dialectical Variations of Kannada on Auditory-Perception of Vocal Emotions**” is a result of my own study done under the guidance of Dr. K. Yeshoda, Associate Professor, Department of Speech-Language Sciences, All India Institute of Speech and Hearing, Mysuru. This dissertation has not been submitted earlier to any other university for the award of any diploma or degree.

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## **CHAPTER-I**

### **INTRODUCTION**

The voice is one of the prime channels for the expression of emotion, a fact that has been commented upon ever since the ancient school of rhetoric. A reasonable argument can be made that the phylogenetic persistence of vocalization as a means of expressing emotions offers valuable insights into the evolution of speech and music in the human species (Scherer, 2018). Our voice not only reveals details about our biological, psychological, and social status but also serves as a means to express emotions through various channels, including prosody, semantics, and non-speech sounds (Schwartz & Pell, 2012). During the early stages of human phylogenetic development, the voice likely served as an alert system which presumably shaped perception and vocal expression of emotions (Scheiner & Fischer, 2011). Lima et al. (2019) found out that humans naturally and instinctively express and perceive vocal emotions effortlessly in their day-to-day interactions. The expression of emotions enables individuals to effectively convey vital information to others, influencing their behaviours. Similarly, the ability to recognize emotions allows individuals to swiftly make inferences about the likely intentions and behaviours of those around them (Juslin & Laukka, 2003).

Elicitors, receptors, states, expressions, and experience are the five types of emotions. Stimuli that arouse emotions are known as emotional elicitors. In the central nervous system, emotional receptors are relatively specialized locations or pathways that influence changes in the physiological and/or cognitive states of the organism. The particular pattern of alterations in somatic and/or neural activity that coincide with the activation of emotional receptors is known as the emotional state. The overt, visible surface characteristics of altered facial, body, voice, and activity level that go hand in

hand with emotional states are known as emotional expressions. The conscious and unconscious interpretations and assessments that people make of their observed emotional states and manifestations are known as emotional experiences. In the organismic view, the connection between elicitors, receptors, expressions and states is biologically determined. Thus, elicitors are connected to receptors, which in turn produce certain states. States can be directly inferred from expressions. Emotional experiences are often not considered aspects of emotion (Lewis, 2010).

### **Emotion expressions and Cultural variability**

Previous research on cultural differences in emotion perception have concentrated on facial expressions. Reports on cultural roots influencing vocal expressions of individuals are minimal. Nevertheless, it is noteworthy that cultural variability may also impact how perceivers integrate auditory and visual cues (Tanaka & Koizumi, 2010).

In a previous study conducted by Davitz (1969), the ability to recognize vocal expressions was found to have no correlation with the alignment of the cultural backgrounds of the speaker and the listener. The study included participants from the United States, Japan, and Israel. Individuals from Japan and Israel who were residing in the United States for 6 to 8 months were selected for the study. These participants were instructed to sequentially express six emotions while reciting the alphabets in their native language. Subsequently, participants from the three countries listened to recordings of speakers from each country, attempting to identify vocal expressions of emotion. Surprisingly, there was no significant advantage in recognizing emotional expressions in one's own language compared to the other two languages. The emotions that were most accurately recognized were consistent across all three groups. Both

Japanese and American participants excelled in recognizing anger, followed by sadness, pride, love, nervousness, and jealousy. Israeli participants differed slightly, demonstrating better recognition of sadness compared to anger. Specific recognition rates for individual emotions were not provided by the authors.

Further, the authors stated that there were multiple reasons for the diminished recognition of vocal expressions from another culture. Firstly, emotional expression could consist of elements that are both universal and specific to a particular culture. Secondly, the overall tonality of a language might convey expressive content to someone from a different cultural background, potentially overshadowing the expressive content of individual utterances. Thirdly, the emotion words deemed equivalent in different languages may differ substantially in significant respects (Mesquita & Frijda, 1992).

Meta-analysis have compiled evidence supporting the presence of an in-group advantage, indicating that individuals tend to be more accurate in judging expressions from their own cultural group as opposed to those from other cultures (Laukka et al., 2019). Variability in the accuracy of emotion recognition across cultures is often linked to linguistic differences. The translation of emotional concepts and labels into different languages can introduce nuances and variations in meaning. The specific words chosen for translation may carry slightly different connotations in cultures distinct from the one in which the experiment originated. This linguistic diversity contributes to the cultural variability observed in the accurate interpretation of emotions. The precision of emotion recognition is probably affected by the extent of cultural exposure shared between judges and speakers. There is considerable conjecture indicating that the manner of emotional expression might differ among cultural groups. As a result, individuals tend to have a better understanding of emotions expressed in a style familiar

to their own cultural context. The amount of exposure between cultures plays a moderating role in shaping the effectiveness of emotion recognition, highlighting the importance of considering cultural familiarity when assessing emotional expressions (Elfenbein & Ambady, 2002).

### **Emotion Expression and Dialectal Variability**

Dialect is the impartial label to refer to any variety of languages that is shared by a group of people in the community (Blackwell, 2016). In any community of language speakers, subgroups emerge based on different factors, each displaying distinct linguistic features compared to other groups. These factors, including geography, socioeconomic class, racial or ethnic identity, gender, and age, contribute to linguistic variations. Language exhibits diverse dimensions of variability, encompassing shifts from one style to another, differences between regional or social varieties, variations across historical periods of a language, and distinctions between different languages (Kumar & Ansari, 2011).

The dialect theory of communicating emotion posits that the emotional language is universally shared. Analogous to various spoken languages, different cultures may express emotions through distinct dialects, constituting the theory's initial proposition. The second proposition suggests that the existence of these dialects has the capacity to diminish the accuracy of emotion recognition when transcending cultural boundaries. In accordance with dialect theory, accuracy falters when cultural differences are present on both ends of the communication process. Optimal communication accuracy occurs when there is alignment between the expression style and the style perceived by the observer, while it diminishes when a mismatch exists (Elfenbein et al., 2007).

Linguistic dialects are variations subordinate to a main language, characterized by differences in pronunciation, grammar, syntax, or vocabulary. These distinctions are shaped by geographical, national, cultural, and social influences, encompassing differences in class and status (Romaine, 1994). Similar to linguistic dialects, the foundation of human language for emotional expression may display dialects marked by differences in the manner of expression and interpretation. A meta-analysis indicates that emotional dialects could be influenced by aspects like geography, nationality, and social distinctions, mirroring patterns seen in linguistic dialects. Just as linguistic dialects influence the diverse shaping, expression, and understanding of the same basic language, emotional dialects may contribute to variability in how emotions are conveyed and interpreted (Elfenbein & Ambady, 2002).

### **Dialects in Kannada Language**

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 (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).

### **Need for the study**

India has a rich cultural and linguistic diversity of 447 documented languages and several regional dialectical variations. Traditional customs, social norms, beliefs, political systems, and ethical values have been moulded by this cultural and linguistic diversity. Culture and language play pivotal roles in both the expression and comprehension of emotions (Altrov & Pajupuu, 2015). Studies have shown that individuals tend to recognize emotion expressions more accurately when they come from members of their own culture. Cultural differences between communication partners could result in poorer identification of emotions (Elfenbein et al., 2007). Within a language, dialects play a significant role in comprehending the speaker's intended message. Each dialect possesses its own distinctive characteristics. The language spoken by an individual conveys emotions, and this is reflected in dialectical variations.

Speech-language pathologists (SLPs) in India, in contrast to their counterparts in Western countries, regularly engage with patients from a broad spectrum of linguistic, academic, and economic backgrounds. However, the preparedness of SLPs in these diverse clinical encounters is often hindered by the absence of multilingual and

multicultural instructional courses within the speech-language pathology curriculum in India. The absence of such educational programs underscores the importance of investigating the challenges and barriers faced by Indian SLPs when dealing with multilingual patients in the context of assessment and intervention (Valliappan et al., 2023).

In Indian scenario, the speech language pathologists are exposed to multilingual settings. Hence, it is important to be aware of the probable dialectal variations in a language, specifically the national, regional and one's native language. Because, dialects vary in terms of the vocabulary, phonology and morpho-syntactic structures (Upadhyaya, 1976) and such awareness will be beneficial to professionals who deal with spoken language for communication. Investigations using quantitative acoustic measures of voice to understand the socio-cultural-linguistic impacts of voice on spoken language communication will yield insights into the shared intricacies between these aspects. This will be a novel initiative as there are no research exploring the impact of dialects in the expression of vocal emotions.

Recognizing the influence of dialects, which also serves as an expression of cultural diversity among the regions of Karnataka, has potential to enhance understanding of the interrelationship between socio-cultural-linguistic domains on voice which will have a potential impact on service delivery by Speech Language Pathologists in a multicultural community.

### **Aim of the study**

- To investigate the effect dialectal variations of Kannada on the auditory perception of vocal emotions.



**Objectives**

- To develop and validate sentence list in Kannada representing the emotions of happiness, neutrality and grief.
- To investigate the auditory perceptual identification (correctness) of vocal emotions within each group.
- To compare the auditory-perceptual identification (API) of vocal emotions between the speakers of three groups.

**Null hypothesis**

- There is no significant difference in the auditory perceptual identification (correctness) of vocal emotions within each group.
- There is no significant difference between the auditory-perceptual identification of vocal emotions in speakers of three groups.

## **CHAPTER-II**

### **LITERATURE REVIEW**

#### **Voice and Emotional Expression**

“Emotional expressions infuse social interactions with spirited declarations of our inner feelings that are difficult to fake, and that our friends, coworkers, and loved ones rely on to decipher our true commitments”, Laukka et al. (2019). The voice serves as a crucial emotional conduit as it carries spoken language. Moreover, listeners can discern vocal expressions even over long distances and in situations where facial or gestural cues are absent, such as during telephone conversations. Everyday experiences demonstrate that auditory stimuli consistently evoke emotion-related responses in listeners, ranging from the powerful resonance of thunderstorms to the gentle drip of a faucet. According to Laukka (2005), vocalizers encode meaning related to affect in their signals, which listeners then decode. Emotional expression is thus likened to a form of code used by vocalizers to represent their emotional states in a manner akin to language.

Cowen et al. (2019) proposed a theoretical framework to illustrate how individuals conceptualize and express emotions within a semantic framework. They utilized large-scale data collection and analysis methodologies to examine 2032 emotional vocal bursts generated in controlled laboratory environments, alongside 48 instances from real-world situations by U.S. English speakers. Findings reveal that these vocal bursts communicate at least 24 distinct types of emotions and the organization of emotion recognition is more strongly influenced by emotion categories (sympathy, awe) than affective evaluation (valence and arousal).

Banse and Scherer (1996) studied acoustic profiles in vocal emotion expression. Six professional actors conveyed 14 emotions through the use of two standard sentences and two scenarios. Authors noted that differences in acoustic properties associated with

discrete emotion categories such as modulations in fundamental frequency, intensity and duration are correlated with a general state of physiological arousal. High arousal emotions such as happiness are characterized by increases in f0 range, intensity, and duration, whereas decreased f0 range, intensity, and duration are typical of low arousal emotions such as sadness. Anger is conveyed not only by linguistic content but can also be reliably identified by non-linguistic content. Anger is characterized by acoustic properties such as increased f0 variability, greater intensity and shorter durations compared to neutral utterances.

There is an abundant literature (Williams, & Stevens 1972; Murray, & Arnott 1993; Dellaert, Polize & Waibel, 1996; Pertushin, 2000; Scherer, 2003) on vocal emotion perception abilities of normal hearing listeners and many of these studies have used artificial intelligence systems. Emotional speech which is recorded in naturally occurring situations have poor recording quality and it also contains some difficulty in terms of defining the nature and number of the underlying emotion types (Williams & Stevens, 1972; Murray & Arnott, 1993; Dellaert, Polize & Waibe, 1996; Pertushin, 2000; Scherer, 2003).

### **Vocal emotional expression and Sex as a factor**

Bonebright et al. (1996) studied gender stereotypes in the expression and perception of vocal affect. Authors considered 5 emotions (fear, anger, happiness, sadness and neutral) elicited by 6 trained actors (3 male and 3 female). Speakers required to record reading tasks of 120 passages (24 passages of each emotion). For the perceptual experiment, group of 104 participants (52 males and 52 females) in the age range of 18 to 32 years were recruited. The listener group was divided into 2 groups, group 1 participants served as judges and group 2 participants served as raters. Judges

for the listening task were asked to decide which of the emotion was portrayed for each passage and raters were asked to rate the effectiveness of each portrayal using a scale of 1 (not performed well) to 7 (performed well). Results revealed that female judges identified fear, happiness and sadness better than males. Male actors' portrayals of anger and fear were identified better than female actors. Female actors received higher identification rates than male actors for portrayals of happiness. Authors obtained mixed results on gender stereotypes. Hence, partial support for the general hypothesis that there is behavioural evidence of stereotypic gender differences for vocal affect was obtained from the study.

Lausen and Scahacht (2018) studied gender differences for the recognition of vocal emotions. Totally 268 participants in the age group of 18 to 36 years were equally divided into two groups (67 males and 67 females) recruited for listening experiment. 46 actors (22 male and 24 female speakers) were recruited to record the stimuli. One group listened to words and pseudo words and the other group listened to sentences and affect bursts. The results revealed that when listening to words and pseudo-words, participants had higher rates of identifying emotions conveyed by male actors compared to female actors. Conversely, when listening to sentences and affect bursts, identification rates were higher for emotions expressed by female actors than male actors. However, the varied pattern of emotion-specific effects suggested that the reliability of emotion judgments in the vocal channel was not consistently affected by the gender of speakers or the associated stereotypes of emotional expression.

### **Vocal emotional expression and Age as a factor**

Morningstar (2017) studied the age-related differences in the production and recognition of vocal socio-emotional expressions. Author recruited 24 child actors (17

females and 7 males) in the age range of 9-15 years and 30 adult actors (15 females and 15 males) in the age range of 18 to 63 years old for the portrayal of emotions (anger, disgust, fear, happiness, sadness). 5 standard sentences with neutral meaning was selected as the stimuli and the actors were asked to express the sentences in the emotions asked. For the listening task, 86 adults (51 females, 35 males), aged 18 to 30 years old and 61 child listeners (34 females, 27 males), aged 9 to 16 years old were recruited. Result of the study revealed that there was marked differences in the ways in which adults and children conveyed socio-emotional expressions vocally. Adults' vocal expressions were more distinct in pitch from one another than those of adolescents; given the influence of pitch cues on the identification of emotional intent in the voice. In the listening task, adult listeners were more accurate in recognition of the vocal expressions than younger listeners.

### **Emotion expressions and Cultural variability**

The expression and understanding of emotions depend on culture and language (Altrov & Pajupuu, 2015).

Variability in the accuracy of emotion recognition across cultures is often linked to linguistic differences. The translation of emotional concepts and labels into different languages can introduce nuances and variations in meaning. The specific words chosen for translation may carry slightly different connotations in cultures distinct from the one in which the experiment originated. This linguistic diversity contributes to the cultural variability observed in the accurate interpretation of emotions. The accuracy of emotion recognition is likely to be influenced by the degree of exposure between the cultures of judges and targets. There is significant speculation suggesting that the style of emotional expression may vary across cultural groups. As a result, individuals tend

to have a better understanding of emotions expressed in a style familiar to their own cultural context. The amount of exposure between cultures plays a moderating role in shaping the effectiveness of emotion recognition, highlighting the importance of considering cultural familiarity when assessing emotional expressions (Elfenbein & Ambady, 2002).

Wolfram and Schilling (2015) reported that dialects are the neutral labels that refer to any variety of languages that are shared by a group of people in the community. Language dialects vary from one region to another region (Ramachandra Rao, 1978). Every group of language users will be separated into smaller groups based on a variety of criteria, and each group will have certain linguistic characteristics that set it apart from the others. There exist several aspects of diversity in language, including differences in styles, regional or social varieties, historical periods of language evolution, and language to language. In the same geographical area, the different kinds of people show variations in their language. Even though the language used is same, the use of phonemes or syllables gives it different linguistic meaning.

Scherer et al., (2001) studied emotion inferences from vocal expressions and their correlation across languages and culture. Four professional actors (two male and two female) recorded their voices for scenarios describing emotion-eliciting situations. Additionally, they provided recordings of two meaningless multilingual sentences. All recordings were made in the emotions of happiness, sadness, fear, anger, and disgust. In total 428 participants in the age range of 18 to 30 years were recruited across 9 countries. Participants were asked to focus on the emotion expressed rather than on the meaning of the utterances. Participants were told of the possibility that more than one emotion might be expressed in a portrayal (as in real-life expressions) and were given the choice of circling two labels for a given stimulus if they thought that a blended

emotion was portrayed. Neutral label was not to be used to label emotion with weak intensity. Results revealed that German actors were best recognized by German judges. The second highest rank in recognition accuracy is obtained for the French-speaking Swiss sample, followed by Great Britain, the Netherlands, the United States, Italy, France, Spain, and Indonesia. Gender of the judges or speakers did not show any significant difference in the study. It was concluded that culture and language-specific paralinguistic patterns may influence the decoding process.

In a study by Banse et al., (1996) noted that variations in acoustic properties was linked to specific emotion categories, such as changes in fundamental frequency, intensity, duration and correlated with an overall state of physiological arousal. Emotions with high arousal levels, like happiness were distinguished by heightened fundamental frequency ( $f_0$ ) range, intensity, and duration. Conversely, emotions with low arousal levels, such as sadness were marked by reduced  $f_0$  range, intensity, and duration. Anger, in addition to linguistic cues was consistently recognized through non-linguistic elements. Anger was also characterized by acoustic properties such as increased  $f_0$  variability, increased intensity, and shorter durations when contrasted with neutral utterances.

Gender disparities were evident in the recognition accuracy of vocal emotions, showing that females excelled in decoding emotions compared to males. Moreover, the research confirmed that emotional expressions conveyed by females were identified more accurately than those expressed by males (Lausen & Schacht, 2018).

Roy and Yeshoda (2011a) employed three primary emotions happiness, sadness and neutral emotions to check the role of cognitive cueing in eliciting vocal variability and speech naturalness using 10 males and 10 females ranging in age from 20 to 25 years. English sentences for each emotion along with cognitive cues for every sentence

were constructed. Three judges rated each of the sentences in two conditions (uncued and cued) individually on a three-point rating scale. Results revealed strong evidence of influence of cognitive cueing on the vocal variability. Sex difference that was noted was attributed to the known fact that females were more expressive than males. The measured acoustic parameters indicated that the Happy emotion had a faster speaking rate, higher F0, wider F0 range and an upward inflection compared to the Neutral emotion. Sad emotion showed slightly lower average F0, F0 range and slower speech rate compared to the neutral emotion. Listening experiment also revealed that the judges perceived the sentences in cued conditions to be most variable and more natural than the uncued conditions. The authors concluded that cognitive cueing resulted in perceivable and quantifiable changes in vocal attributes. Roy and Yeshoda (2011b) explored the effect of cognitive cueing in bringing forth noticeable changes in speech using different sentences in English that depicted five emotions, namely, neutral, happy, anger, fear and sad. 20 participants, equally distributed across the two sexes read the sentences of different emotions thrice. First trial was the uncued condition whereas the second and third trials were cued conditions that were read following the presentations of the cognitive cues. MSF0 and its related parameters and sentence duration in cued conditions revealed changes compared to uncued conditions for all emotions which warranted the authors to conclude that cognitive cues enhances voice patterns altering speaking styles of individuals.

### **India as a melting pot of Cultural diversities**

India is a land of cultural diversities and multilingualism. Most of the states have their official languages even though some states share cultures and languages. Shared cultures give rise to variations in languages that are known as dialectal



variations. Dialectal variations are common in the major languages of the country including the national language, Hindi. India is distinctly divided into five major regions: the south, the north, the east, the west and the central. The Southern part of the country is home to five major states and Karnataka being one of the major southern states. The people of the state of Karnataka are referred to as “Kannadigas” and Kannada is the official language of the state.

### **Kannada and it’s dialects**

The majority of Kannada speakers, or over 40 million people, are Kannadigas. Kannada is one of the most commonly spoken languages in the world functions as the state of Karnataka's official and administrative language. Kannada, a language that is mostly spoken in South India, especially Karnataka, is a member of the Dravidian language family. Scholars have recognised seven unique regional variants or dialects of Kannada, despite the standard form being commonly linked with the Mysore Bangalore dialect (now Mysooru Bengalooru) (Rajapurohit, 1982; Shridhar, 2007). Some of them are the Kannada languages of Mysooru, Dharawada, Mangalooru, Gulbarga, Karwar, Mercara, and Chitradurga. The Mysooru, Dharawada, Mangalooru, and Gulbarga dialects are thought to be the most well-known among them (Upadhyaya 1978, Rajapurohit, 1982; Shridhar, 2007).

According to Altrov and Pajupuu (2015), the effect of language and dialects on vocal emotional perception involves understanding how different languages and dialects affect the way emotions are expressed and perceived through vocal cues. Variations in the prosodic features, such as, intonation, pitch, rhythm, and other characteristics across languages and dialects are speculated to influence how emotions are conveyed and interpreted by listeners. Language and dialects can affect (a) Emotion

Recognition: Different languages and dialects may have unique vocal characteristics and cultural norms that influence how emotions are expressed and perceived. For instance, the intonation, rhythm, and pitch used to convey certain emotions can vary widely. (b) Cultural Context: Emotional expressions are often deeply rooted in cultural contexts, and speakers of different languages or dialects may interpret the same vocal cues differently based on their cultural backgrounds. (c) Accuracy and Speed of Perception: Familiarity with a particular language or dialect can impact how quickly and accurately one can identify emotions. Native speakers or those fluent in a dialect may be better at perceiving subtle emotional cues. (d) Cross-Linguistic Comparisons: Provide insights into universal versus language-specific aspects of emotional expression, helping to identify which vocal features are universally recognized and which are culturally specific. These factors may impact cross-cultural communication and the ability to accurately recognize emotions in speakers from different linguistic backgrounds. Hence, understanding these factors can help improve cross-cultural communication and enhance emotional intelligence.

Studies exploring prosodic characteristics in Indian languages are predominant compared to those that explore vocal emotions. Understanding vocal emotions, its nature, characteristics using various Indian languages are scanty. Further, auditory-perceptual experiments targeting identification of vocal emotions in Indian languages and even more specifically understanding dialectal variations and their influence on identification of vocal emotions are much scantier. This necessitated the need to plan a study to investigate the role of dialectal variations in Kannada language on the auditory perception of vocal emotions using the three primary emotions in adults.

## **CHAPTER-III**

### **METHOD**

#### **Study design**

Cross-sectional, comparative, observational study.

#### **Participants**

Sixty literate adult native speakers of the Kannada language in the age range of 25 to 40 years were included in the study and the details are shown in Tables 3.1 to 3.3. The participants represented three regions of Karnataka and were equally divided into three groups:

- Group I included 20 (10 males and 10 females) participants using the Mangaluru dialect of Kannada who lived/ were living in the Udupi region of Karnataka for the past five years (Table 3.1).
- Group II included 20 (10 males and 10 females) participants using the Bengaluru dialect of Kannada who lived/ were living in Mysuru region of Karnataka for the past five years (Table 3.2).
- Group III included 20 (10 males and 10 females) participants using the Gulbarga dialect of Kannada who lived/ were living in the Kalaburagi region of Karnataka for the past five years (Table 3.3).

The participants were selected based on the following inclusion criteria.

#### **Inclusion criteria**

- Native speakers of Kannada with proficiency in the Kannada language.
- Minimum education of 10th standard pass and a maximum of Graduation in any field.

**Table 3.1***Details of participants in Group 1*

<b>S no.</b>	<b>Age (years)</b>	<b>Sex</b>	<b>Languages Known</b>	<b>Education</b>
1	29	Female	K,T, H	BA
2	33	Female	K,T	10 <sup>th</sup>
3	30	Female	K,T	BA
4	32	Female	K,T,H	12 <sup>th</sup>
5	37	Female	K,T,KO	12 <sup>th</sup>
6	26	Female	K,T,M	12 <sup>th</sup>
7	36	Female	K,T	12 <sup>th</sup>
8	27	Female	K,T,E	BA
9	34	Female	K,T,E	BA
10	31	Female	K,T,E	12 <sup>th</sup>
11	31	Male	K,T,E	B.Com
12	30	Male	K,T,E	12 <sup>th</sup>
13	26	Male	K,T,E	B.Com
14	34	Male	K,T,E	B.Com
15	37	Male	K,E,H	B.Com
16	39	Male	K,T	12 <sup>th</sup>
17	32	Male	K,T,E	BA
18	38	Male	K,T	BA
19	37	Male	K,T	10 <sup>th</sup>
20	37	Male	K,T	B.Com

*Note.* K-Kannada, T-Tulu, KO-Konkani, E-English, H-Hindi, M-Marathi

As shown in table 3.1, group 1 included female participants with mean age of 31.70 years. Male participants with mean age of 34.10 years.

**Table 3.2***Details of participants in Group 2*

<b>S no.</b>	<b>Age (years)</b>	<b>Sex</b>	<b>Languages Known</b>	<b>Education</b>
1	26	Female	K, E	B.Com
2	30	Female	K,E,H	B.Com
3	38	Female	K,E	BA
4	31	Female	K,E	BA
5	30	Female	K,E	B.Com
6	32	Female	K,E	B.Com
7	38	Female	K,H	10 <sup>th</sup>
8	33	Female	K,H	12 <sup>th</sup>
9	39	Female	K,H	10 <sup>th</sup>
10	31	Female	K,H,E	B.Com
11	32	Male	K,E	B.Com
12	32	Male	K,E	BA
13	28	Male	K,E	B.Com
14	27	Male	K,E	B.Com
15	27	Male	K,E	12 <sup>th</sup>
16	27	Male	K,E	BA
17	33	Male	K,H	B.Com
18	31	Male	K,H	BA
19	31	Male	K,E	B.Com
20	26	Male	K,H,E	B.Com

*Note.* K-Kannada, E-English, H-Hindi

As shown in table 3.2, group 2 included female participants with mean age of 32.80 years. Male participants with mean age of 29.40 years.

**Table 3.3***Details of participants in Group 3*

<b>S no.</b>	<b>Age (years)</b>	<b>Sex</b>	<b>Languages Known</b>	<b>Education</b>
1	27	Female	K, E,H	B.Com
2	25	Female	K,H,T	12 <sup>th</sup>
3	29	Female	K,H,M	12 <sup>th</sup>
4	33	Female	K,E,H	BA
5	27	Female	K,H	12 <sup>th</sup>
6	26	Female	K,E,H	B.Com
7	34	Female	K,H,M	12 <sup>th</sup>
8	37	Female	K,H	12 <sup>th</sup>
9	29	Female	K,H,T	BA
10	34	Female	K,M	10 <sup>th</sup>
11	29	Male	K,H	12 <sup>th</sup>
12	28	Male	K,E,H	B.Com
13	28	Male	K,E,H	B.Com
14	40	Male	K,H	10 <sup>th</sup>
15	27	Male	K,E,H	B.Com
16	36	Male	K,M,H	12 <sup>th</sup>
17	28	Male	K,H,E	B.Com
18	28	Male	K,H,E	BA
19	29	Male	K,E	B.Com
20	26	Male	K,H	12 <sup>th</sup>

*Note.* K-Kannada, T-Telugu, E-English, H-Hindi, M-Marathi, U-Urdu

As shown in table 3.2, group 2 included female participants with mean age of 30.10 years. Male participants with mean age of 29.90 years.

### **Exclusion criteria**

- Individuals who were level 1 professional voice users (singers, actors, theatre artists, and voice-over artists), Speech-Language Pathologists/Audiologists.
- History or reported issues related to communication skills, including cognitive, hearing, speech, and voice disorders, as well as psychological, neurological, and pulmonary problems.

### **Procedure**

#### **Phase I: Development of the test stimuli (sentences)**

The main sources for selecting the sentences included archived materials from prominent Kannada newspapers, Kannada textbooks of Grade VI to IX (state syllabus) and from everyday conversations. The sentences chosen were confined to three primary emotions: happiness, neutrality, and grief and selected based on the following criteria.

- a) The total number of words ranged from three to six.
- b) They comprised of words that were recognizable.
- c) They did not contain punctuation characters.
- d) They were reflected in spoken conversation.
- e) They lacked proverbs or exclamations.
- f) They were syntactically and grammatically correct.
- g) They were semantically neutral or emotionally-loaded (happy and grief).

A pool of 75 sentences (25 each for the emotions- happiness, neutrality, and grief) was formulated, which satisfied all the above-mentioned criteria. The selected 75 sentences were rated on their content validity in terms of difficulty level, recognition of words, ambiguousness and grammar by five adult native Kannada

speakers who were proficient in reading and writing Kannada. Based on the content validation ratings, a set of the most appropriate 45 sentences, with 15 sentences allocated for each emotion, formed the final sentence list, i.e., the test stimuli for the study (Appendix A).

### **Phase II: Stimulus Recording**

A 22 years old native Kannada-speaking female with the ability to convey emotional expressions with clear articulation, enunciation in spoken sentences was selected as the speaker for recording the test stimuli of the study. The speaker was provided with instructions to convey sentences with emotions of happiness, neutrality, and grief. The stimuli were printed on A4-sized paper, with fifteen stimuli per page. It was emphasized that the speaker should avoid using stereotypical and exaggerated emotional expressions. The finalized 45 sentences (15 sentences for each emotion) were audio-recorded. The speaker was instructed to well-articulate and convey vocally the intended emotion. Practice sessions were provided prior to the audio-recording. Of these 45 sentences, only 30 sentences (Appendix B) were chosen randomly for the auditory-perceptual experiment task owing to time factor.

The Computerized Speech Lab (4500) (Kay Pentax, NJ) was used to audio-record the stimuli. The recording took place in a sound-treated room with the microphone positioned approximately 10 centimeters away from the mouth of the speaker. A sampling rate of 44,100 Hz was used for audio-recording the samples. Each sentence was saved as an individual sound file in (.wav) format.

### **Phase III: Auditory Perceptual Judgement**



The Experimental Paradigm software (version 2.5.0.68, perception research systems incorporated, Lawrence, Kansas, United States of America) was used to present the recorded sentences to participants, who listened to the stimuli and identified the conveyed emotion from the options displayed on the computer screen. The responses of the participants were recorded, saved and exported to an Excel sheet format for later analysis.

The audio-recorded stimuli (sentences) were utilized for the perceptual experiment in Phase III. Participants were comfortably seated in a room with minimal background noise. The sentences were played on a DELL Inspiron 15 3000 with a 64-bit operating system through headphones.

Participants were instructed as follows: "You will hear audio recordings of sentences. Please listen and select the appropriate emotion that is conveyed in the sentence, i.e., identify the depicted emotion (happy, neutral or grief) in each sentence. It is important that you should not focus on the meaning of the stimulus, but on the tone of voice and the emotion conveyed. Your response will be noted".

**Consent:** Informed written consent shown in Appendix C was obtained from all participants after explaining the aim of the study.

### **Analysis**

The responses of the 60 participants were tabulated as the number of correctly identified emotions and error responses for each sentence based on gender and dialect. Each correctly identified emotion received a score of 1 and incorrect identification was scored "0-zero". The tabulated data were reviewed to ensure no erroneous response was included for statistical analysis.

**Statistical Analysis**

Statistical Package for the Social Sciences (SPSS software, version 26.0) was utilized for statistical analysis. The research variables for the present study were as follows:

Dependent variable: Emotions (Happiness, Neutrality and Grief)

Independent variables: Gender, Dialect (Mangalore, Bengaluru and Kalaburagi).

## CHAPTER-IV

### RESULTS

The present study aimed to investigate the effect of dialectical variations of Kannada language on the auditory perception of vocal emotions. The study included three groups of participants (Group I: Mangalore dialect, Group II: Bengaluru dialect and Group III: Gulbarga dialect) with n= 20 in each dialectal group and equal gender distribution. The thirty sentences, ten for each of the three emotions (happiness, neutrality, and grief) were perceptually judged to identify the emotion conveyed.

The results have been explained based on the objectives in below headings.

#### **4.1 Development and validation of sentence list in Kannada representing the emotions**

The sentences were chosen from prominent Kannada newspapers, school textbooks, and daily conversations. They focused on three primary emotions: happiness, neutrality, and grief, and were selected based on specific criteria. A total of 75 sentences (25 for each emotion) was initially formulated. Five adult native Kannada speakers, aged between 25 to 40 years, proficient in reading and writing Kannada, rated these sentences for content validity, considering factors such as difficulty level, word recognition, ambiguity, and grammar. Based on these ratings, a final set of the most appropriate 45 sentences (15 sentences for each emotion) were selected and shown in (Appendix A). The final stimuli list had randomly chosen 30 sentences, ten sentences for each emotion (shown in Appendix B) used for the Phase III.

#### **4.2 Comparison of auditory perceptual identification of three emotions within each group**

The second objective of the study was to compare the identification scores within each group.

Shapiro-Wilk test was performed to check the normality of the data. Normality test revealed that most of the data were non-normally distributed. Hence, non-parametric tests were chosen for further statistical analysis. The comparison was done in each group and the results are given in the following sections.

The Table 4.1 shows the percent correct identification of emotions by all the participants of the three groups. Happiness emotion received maximum percent responses in all the groups followed by Grief emotion (except in Group II) and Neutrality. Males in Group I had scored higher correct identification percentages across all the emotions compared to males and female participants of other groups. Overall, the female participants of group II performed well across all the emotions and group III female participants scored significantly lower correct identification percentages across all the emotions. Male participants of group I and group III scored better in correct identification of emotions compared to group II male participants.

**Table 4.1***Percent correct identification of the emotions by the participants of the Groups*

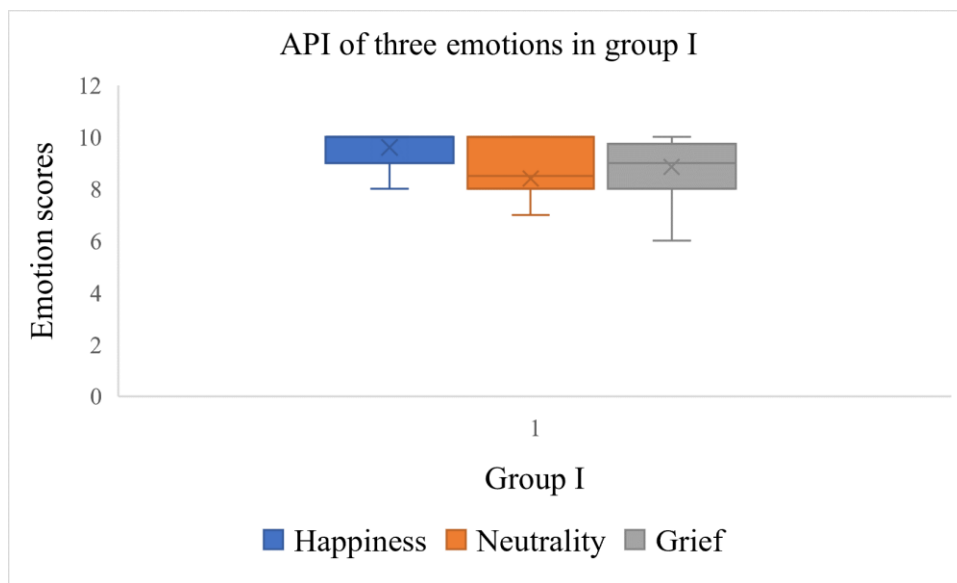
Emotion	Percent Correct Identification					
	Group I		Group II		Group III	
	Male	Female	Male	Female	Male	Female
<b>Happiness</b>	96	96	96	99	99	87
<b>Neutrality</b>	90	78	84	93	87	77
<b>Grief</b>	92	85	87	86	94	78

**4.2.1. Comparison of auditory perceptual identification of emotions in Group I**

The API was compared between each emotion in group 1 (Figure 4.1). The Friedman's test was used for the comparison and the results revealed that there is no significant difference in the identification of emotions in male participants of Group I (Q value= 2.00, p-value= 0.368). However, significant results were obtained for female participants (Q-value=7.26, p-value= 0.027). Bonferroni's post-hoc test (Table 4.2) was administered for pairwise comparison of percentage accuracy of identification of emotions in females of Group I. However, according to the Bonferroni's adjusted significance values, females of Group I did not significantly differ in terms of percentage of correct identification of emotions.

**Figure 4.1**

The box and whisker plot depicts median and range for 3 emotions within Group I

**Table 4.2**

Friedman's test statistics and p values for accuracy of identification of emotions in female participants of Group I

Group I - Females		
Emotions Compared	Test Statistic	p-value
Happiness – Neutrality	0.112	1.000
Happiness – Grief	2.236	0.076
Neutrality – Grief	2.124	0.101

\* p-value < 0.05 is indicative of significant difference

#### 4.2.2 Comparison of auditory perceptual identification of three emotions in Group

#### II

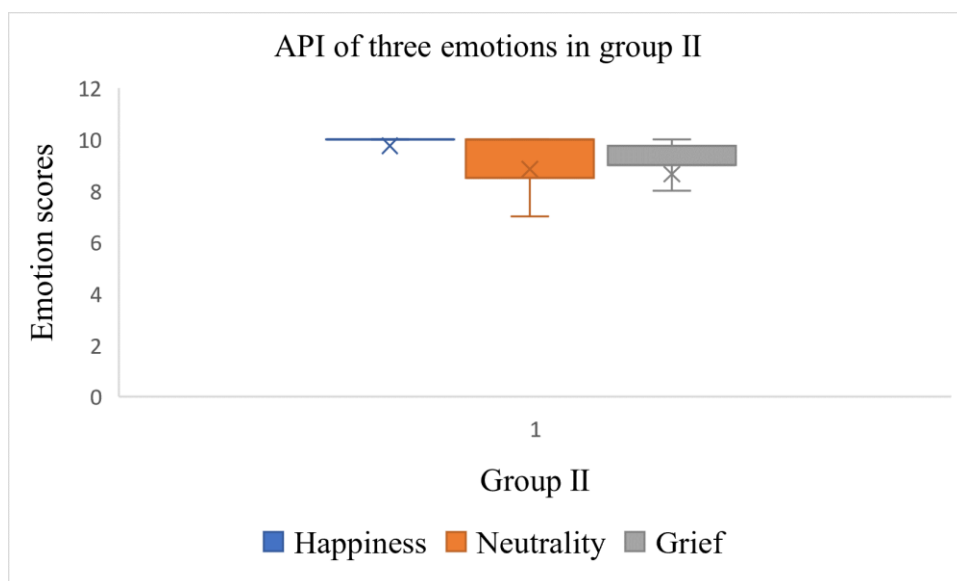
The API was compared between each emotion in group II (Figure 4.2). Friedman's test was done to find the significant difference of three emotions in Group

II. The results revealed that there is no significant difference in the identification of emotions in male participants of Group II (Q value= 0.75, p-value= 0.687). However, significant results were obtained for female participants (Q-value=14.00, p-value= <0.001). Bonferroni's post-hoc test (Table 4.3) was administered for pairwise comparison of percentage accuracy of identification of emotions in females of group II. However, according to the Bonferroni's adjusted significance values, females of group II significantly differ in terms of percentage of correct identification of emotions

The results obtained for female participants of Group II is depicted in Table 4.3.

**Figure 4.2**

*The box and whisker plot depicts median and range for 3 emotions within Group II*



**Table 4.3**

*Friedman's test statistics and p values for accuracy of identification of emotions in female participants of Group II*

<b>Group II- Females</b>		
<b>Emotions Compared</b>	<b>Test Statistic</b>	<b>p-value</b>
Happiness – Neutrality	2.460	0.042*
Happiness – Grief	2.907	0.011*
Neutrality – Grief	.447	1.000

\* p-value < 0.05 is indicative of significant difference

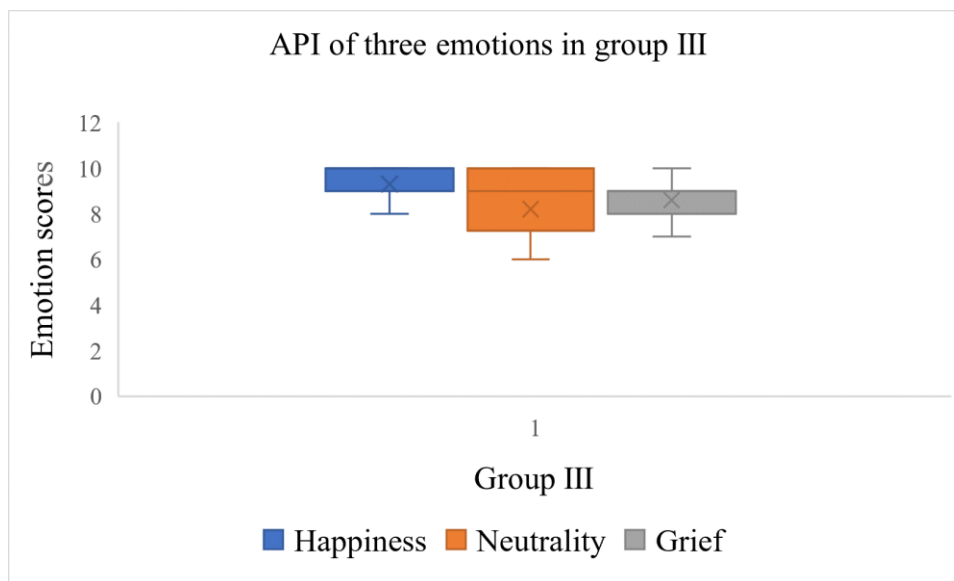
#### **4.2.3 Comparison of auditory perceptual identification of three emotions in group III**

The API was compared between each emotion in group III (Figure 4.3). Friedman's test was done to find the significant difference of three emotions in group III. The results revealed that there is no significant difference in the identification of emotions in male (Q value= 5.543, p-value= 0.063) and female participants (Q-value= 5.419, p-value=0.67) of group III.



**Figure 4.3**

*The box and whisker plot depicts median and range for 3 emotions within group III*



### **4.3 Comparing the auditory-perceptual identification of vocal emotions between the groups**

The third objective of the study was to compare the identification scores between the groups.

Shapiro-Wilk test was performed to check the normality of the data. Normality test revealed that most of the data were non-normally distributed. Hence, non-parametric tests were chosen for further statistical analysis. The comparison was done with respect to each emotion between groups and the results are given in the following sections.

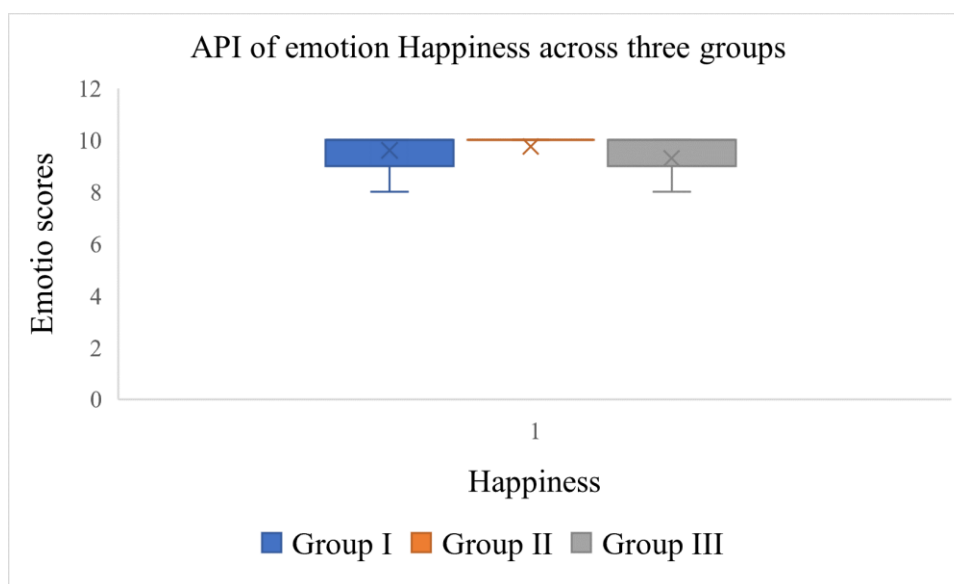
#### **4.3.1. Comparing the auditory-perceptual identification of emotion happiness between the three groups**

The API was compared between each group in emotion happiness (Figure 4.4). Kruskal-Wallis test was done to compare the performance of identification of the

emotion Happiness between three groups. The results showed that there was no significant difference in auditory-perceptual identification of the emotion Happiness across three dialectical groups of male participants (H-value=0.710, p-value=0.701) and for female participants (H-value=2.383, p-value=0.304). Hence, the obtained results reveals that there was no significant difference was seen for the emotion happiness between the groups.

**Figure 4.4**

*The box and whisker plot depicting median and range for emotion happiness between three groups*



#### **4.3.2. Comparing the auditory-perceptual identification of emotion Neutrality between the three groups**

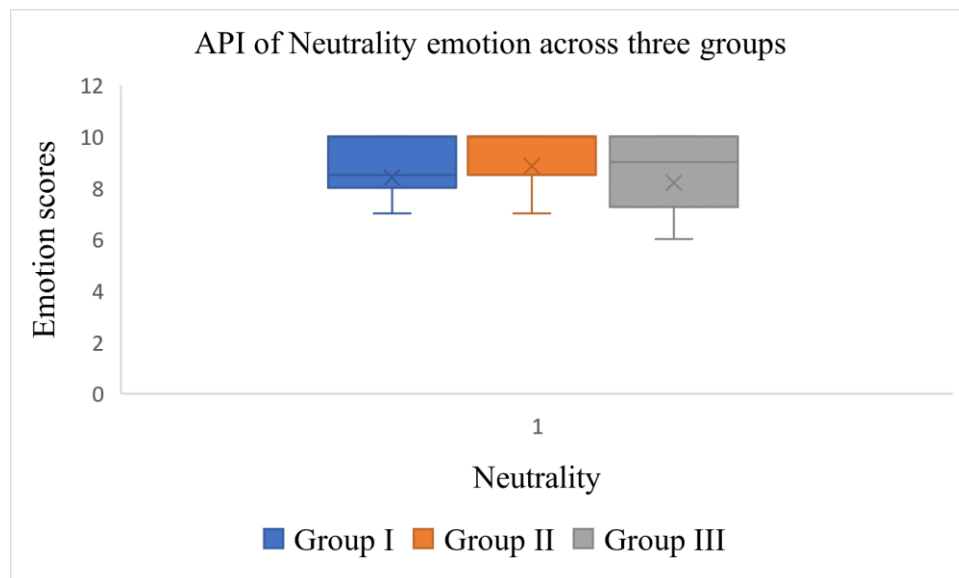
The API was compared between each group in emotion neutrality (Figure 4.5). Kruskal-Wallis test was done to compare the performance of identification of the emotion Neutrality between three groups. The results showed that there was no significant difference in auditory-perceptual identification of the emotion. However,

significant difference was observed for female participants for the emotion Neutrality (H-value=7.365, p-value=0.025).

Bonferroni's post-hoc test (Table 4.4) was administered for pairwise comparison of percentage accuracy of identification of emotion neutrality in females of three groups. However, according to the Bonferroni's adjusted significance values, females of all the three groups significantly differ in terms of percentage of correct identification of the emotion Neutrality. The results obtained for female participants for the emotion Neutrality is depicted in Table 4.4.

**Figure 4.5**

*The box and whisker plot depicting median and range for emotion neutrality between three groups*



**Table 4.4**

*Kruskal-Wallis test statistics and p values for accuracy of identification of Neutrality emotion in female participants across three groups*

<b>Groups Compared</b>	<b>Test Statistic</b>	<b>p-value</b>
Group I – Group III	1.410	0.475
Group I – Group II	2.712	0.020*
Group II – Group III	1.229	0.657

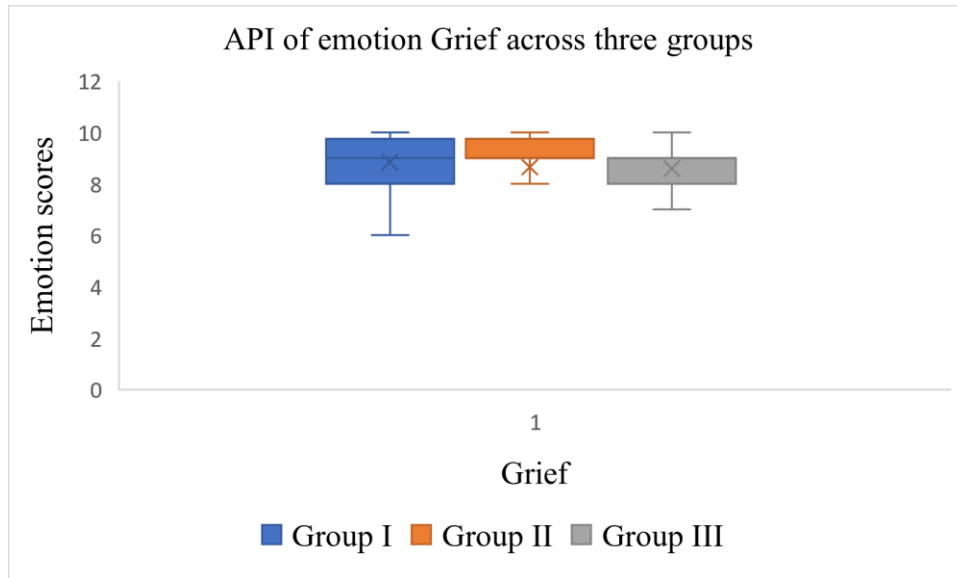
\* p-value < 0.05 is indicative of significant difference

#### **4.3.3. Comparing the auditory-perceptual identification of emotion Grief between the three groups**

The API was compared between each group in emotion grief (Figure 4.6). Kruskal-Wallis test was done to compare the performance of identification of the emotion Grief between three groups. The results showed that there was no significant difference in auditory-perceptual identification of the emotion Grief across three dialectical groups of male participants (H-value=2.539, p-value=0.281) and for female participants (H-value=0.173, p-value=0.917). Hence, the obtained results reveals that no significant difference was seen for the emotions grief between three groups.

**Figure 4.6**

*The box and whisker plot depicts median and range for emotion grief between three groups*



## CHAPTER V

### DISCUSSION

The study aimed to investigate the effect of dialectical variations of Kannada language on the auditory perception of vocal emotions. In this study, comparison of auditory perceptual identification of emotions within and between three dialects of Kannada language were done. The results obtained in the study are discussed in the following sections;

#### **Development and validation of sentence list in Kannada representing the emotions of happiness, neutrality and grief.**

The sentences were taken from well-known Kannada newspapers, Kannada textbooks of Grade VI to IX (state syllabus) and from everyday conversations. They were selected according to particular criteria and focused on three main emotions: Happiness, Neutrality and Grief. First, 75 sentences (25 for every emotion) were created. Five adult native Kannada speakers who were fluent in both writing and reading the Kannada language assessed the content validity of these sentences by taking into account elements including word recognition, ambiguity, difficulty level, and grammar. These evaluations were used to determine the final set of 45 sentences, 15 of which were assigned to each emotion and served as the study's test stimuli (Appendix A). Out of these 45 sentences, 30 sentences (10 allocated for each of the emotion) was chosen for the auditory-perceptual experiment (Appendix B).

#### **Comparison of Auditory perceptual identification of three emotions within each group.**

The highest percentage of correct identification of the emotion happiness was

noted in group II females and group III males, whereas identification of the emotion happiness was lowest for group III females. The emotion Neutrality showed maximum percentage of correct identification by females of group II and lowest identification by females of group III. For the emotion grief, it was highest in males of group III and lowest in females of group III. This suggests that female participants of group III performed consistently poor in terms of correct identification of emotions, whereas group II females performed better in correct identification of emotions. For male participants, group II male participants secured poor scores across all the emotions compared to group I and group III.

Further, Friedman's test was done for the comparison of API of emotions in each group. No significant difference was seen for male participants of all the groups and female participants of group III across all the emotions ( $p > 0.05$ ). However, significant difference was seen for female participants of group I and II ( $p < 0.05$ ). Further Bonferroni's adjustment was done for the significance value, which showed that females of group I did not significantly differ in terms of identification of emotions, whereas group II female participants showed significant difference in identifying the emotion happiness.

Since the recording was done by a native female speaker of formal dialect of Kannada language (Bengaluru dialect) and the stimulus included were adhered to the formal dialect of Kannada language, the female participants from group II (Bengaluru dialect) identified all the emotions better compared to participants from other dialectical groups. This suggests that the listeners in group I and group III dialectical groups significantly differ in their ability to identify different emotions through auditory perception. Also irrespective of dialectical differences, the participants from all the three regions were familiar and proficient with the standard dialect of Kannada

language, which is the Bengaluru dialect.

The better performance in emotion identification by group II female participants may be attributed to their socio-cultural background and contacts, as well as their exposure to other dialects and languages. This broader exposure likely facilitates easier access to relevant information.

In line with the results obtained in the present study, Bonebright et al. (1996) found that female judges were better at identifying emotions conveyed by a female actor compared to male judges. This supports the notion of stereotypic gender differences in vocal effort, reinforcing the findings of the current study.

Another study by Scherer et al., 2001 observed that listeners who share the same language as the speaker are more likely to accurately identify the spoken emotion. This finding highlights the influence of culture- and language-specific paralinguistic patterns on the decoding process in these individuals.

### **Comparing the auditory-perceptual identification of vocal emotions between the groups**

The Kruskal-Wallis test was used to compare the API of vocal emotions (Happiness, Neutrality and Grief) between the groups. Results showed that the male participants across three dialectal groups revealed no significant difference ( $p > 0.05$ ) across all the vocal emotions. For all the three emotions, no significant difference was observed for female participants of group I and group III ( $p > 0.05$ ). Group II participants obtained no significant difference for emotions happiness and grief ( $p > 0.05$ ). However, female participants of group II have obtained significant difference for the emotion neutrality ( $p < 0.05$ ). Further, Bonferroni's adjustment was done for the significance value, which showed that females of group II significantly differ in terms of



identification of the emotion neutrality.

The uniform perception of emotions across dialects in male participants might be due to the universal prosodic features associated with these emotions, which transcend dialectal differences.

All the studies in the literature aimed to identify differences in vocal emotional recognition across languages and cultures, but they did not provide information on dialectal variations. This study primarily aims to examine the effect of dialectal variations of the Kannada language on the auditory perception of vocal emotions.

The overall findings from the auditory-perceptual evaluations within and across the three dialects of Kannada indicate a remarkable consistency in emotional perception. Despite the inherent phonetic and prosodic variations that might exist between dialects, the ability to identify emotions through auditory cues remains stable. This suggests that certain emotional prosodic features are universally recognized by speakers of these dialects, possibly due to shared cultural norms or intrinsic human capabilities in emotion recognition. It could also be implied that the standard dialect, the Bengaluru dialect is used consistently and regularly in media, entertainment industry leading to similarities in practices which permeates even to shared auditory memory for perceptual cues.

Public knowledge, exposure to print media along with wide spread use of social and public media, entertainment modes use a standard dialect of the language. The public dissemination of such content using the digital technology to reach large network of people in all parts of the state could have possibly helped people speaking different dialects to still perceive and identify the standard dialect leading the results of the current study.

## CHAPTER VI

### SUMMARY AND CONCLUSION

The primary aim of the study was to investigate the effect of dialectal variations of Kannada on the auditory perception of vocal emotions. The study included 60 literate adult native speakers of Kannada, aged 25 to 40 years. The participants were divided into three groups based on their dialects and regions in Karnataka. Group 1 participants were from Udupi region of Karnataka who used Mangalore dialect, Group 2 participants were from Mysuru region of Karnataka using Bengaluru dialect and Group 3 participants were from Kalaburagi region of Karnataka and used Gulbarga dialect.

The study was divided into three phases. Phase I was the development of the sentences belonging to the three chosen emotions in the standard dialect of Kannada language, that is, Bengaluru dialect. From the initial 79 sentences, a total of 45 sentences were selected post validation by 5 native proficient Kannada speakers who knew to read and write Kannada. The set of forty-five sentences, 15 sentences per emotion (Happiness, Neutrality and Grief) (Appendix A) were selected for the audio recording in Phase II. The Phase II comprised of the audio recording of the sentences. A native proficient Kannada speaker aged 22 years spoke the 45 sentences with clear articulation, diction and the appropriate emotion and the same were audio-recorded using the CSL 4500 in the sound treated lab. Only thirty sentences, 10 sentences per emotion were selected as the stimuli for the auditory-perceptual judgement task in the third phase and the same are in Appendix B. Phase III was the auditory-perceptual judgement experiment. Here the participants were instructed to listen to the 30 sentences presented randomly through the multimedia headphones using the Experimental Paradigm software and identify the emotion heard and choose the option on the laptop screen. The responses were saved and tabulated. Non-parametric tests

were used for the statistical analysis.

The overall results indicated that the all emotions were better identified by female participants of group II, followed by male participants of group I with a lesser score obtained for female participants of group III across all emotions.

The current study's results indicated that the dialects and the cultural variability do not affect the vocal emotional perception in individuals who used Kannada language. These results highlight the robustness of the language, morphophonological structure of the language and emotional communication in spoken language against dialectical variations. Even though the results indicated that all groups commonly understood the standard dialect across different Kannada dialects this emphasizes the potential of vocal emotions as reliable indicators of the speaker's emotional state. However, emotional expressions in vocal communication are highly variable and chances of misinterpretation and misperception may become high if one's voice characteristics are not cultivated to suit the emotional expressions.

Public knowledge, exposure to different forms of media, such as, print, social channels, entertainment industries that use a standard dialect of the language through digital technology could possibly have helped people speaking different dialects to still perceive and identify the standard dialect leading to the results of the current study.

In conclusion, this study underscores the importance of understanding vocal cues that convey emotions across dialects, providing a foundation for future research on the influence of dialectal variations on the perception of other speaker characteristics, such as age, sex, and physiological or psychological states.

**Implications of the study**

- The Kannada sentences constructed could be utilized as material for future studies on communication disorders.
- The results substantiate voice as an important tool for effective communication.
- The existing understanding of vocal emotion identification and its dialectal variations could be enhanced by the findings of this study
- Replicate findings on Speech-Language Pathologists (SLPs) to investigate effective communication.

**Limitations of the study**

- Limited sample size because of which generalization of results have to be done with caution.
- The study included only three dialects of Kanada, inclusion of the other dialect (Dharwad dialect) would have yield better result.
- The selected sentences were confined to the formal dialect of the Kannada language (Bengaluru dialect).

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## APPENDIX A

### ಸಂತೋಷದ ಭಾವನೆ

1. ನನಗೆ ಸಿನಿಮಾ ನೋಡುವುದು ಅಂದರೆ ತುಂಬಾ ಇಷ್ಟ.
2. ನನಗೆ ಸಿಹಿ ತಿಂಡಿಗಳು ಅಂದರೆ ತುಂಬಾ ಇಷ್ಟ.
3. ಶ್ರೇಯ ತುಂಬಾ ಚೆನ್ನಾಗಿ ಹಾಡನ್ನು ಹಾಡುತ್ತಾಳೆ.
4. ನನಗೆ ಅಣ್ಣಾವು ಸಿನಿಮಾ ನೋಡೋಕೆ ಇಷ್ಟ.
5. ನನ್ನ ಬಾಲ್ಯದ ದಿನಗಳು ತುಂಬಾ ಚೆನ್ನಾಗಿತ್ತು.
6. ನನ್ನ ಮಕ್ಕಳಿಬ್ಬರೂ ಚೆನ್ನಾಗಿ ದುಡಿಯುತ್ತಿದ್ದಾರೆ.
7. ನನಗೆ ಸಂಗೀತದಲ್ಲಿ ಪ್ರಥಮ ಬಹುಮಾನ ಸಿಕ್ಕಿದೆ.
8. ಅಮ್ಮನಿಗೆ ನನ್ನ ಸಂಬಳದ ಹಣದಲ್ಲಿ ಸೀರೆ ತೆಗೆದು ಕೊಟ್ಟೆ.
9. ನನ್ನ ಮಗ ತುಂಬಾ ಚುರುಕಾಗಿದ್ದಾನೆ.
10. ನನ್ನ ವೃತ್ತಿಪರ ಗೆಲುವಿನಿಂದ ಅಪ್ಪ ಅಮ್ಮನಿಗೆ ಖುಷಿಯಾಗಿದೆ.
11. ತಾಜ್ ಮಹಲ್ ನೋಡೋಕೆ ತುಂಬಾ ಚೆನ್ನಾಗಿದೆ.
12. ನನಗೆ ಮಳೆಯಲ್ಲಿ ಆಡುವುದೆಂದರೆ ತುಂಬಾ ಇಷ್ಟ.
13. ನನಗೆ ಕುವೆಂಪುರವರ ಮನೆಗಳಲ್ಲಿ ಮದುಮಗಳು ಪುಸ್ತಕ ತುಂಬಾ ಇಷ್ಟ.
14. ನಾವು ಗೆಲೆಯರೆಲ್ಲರೂ ಕೊಡಗು ಪ್ರವಾಸಕ್ಕೆ ಹೋಗಿ ಬಂದೆವು.
15. ಅಣ್ಣ ನನಗಿಷ್ಟವಾದ ಪಾನಿಪೂರಿ ತಂದುಕೊಟ್ಟಿದ್ದಾನೆ.

### ತಟಸ್ಥ (ಯಾವುದೇ ಭಾವನೆ ಇಲ್ಲದ) ಭಾವನೆ

1. ನನ್ನ ಬಸ್ಸು 10 ಗಂಟೆಗೆ ಇದೆ.

2. ಮೈಸೂರಿನಲ್ಲಿ ಅರಮನೆ ಇದೆ.
3. ಚಿತ್ರದುರ್ಗ ಜಿಲ್ಲೆಯು ಕಲ್ಲಿನಕೋಟೆಗೆ ಹೆಸರುವಾಸಿಯಾಗಿದೆ.
4. ಅವಳು 10 ವರ್ಷಗಳಿಂದ ಸಂಗೀತ ಕಲಿಯುತ್ತಿದ್ದಾಳೆ.
5. ಗಣೇಶನು ಶಾಲೆಗೆ ಹೋದನು.
6. ಅವಳು ಐದು ವರ್ಷಗಳಿಂದ ಸಂಗೀತ ಕಲಿಯುತ್ತಿದ್ದಾಳೆ.
7. ನಮ್ಮ ತೋಟದಲ್ಲಿ ತರಕಾರಿಗಳನ್ನು ಬೆಳೆಯುತ್ತೇವೆ.
8. ನನ್ನ ಕೆಲಸ ಒಂಬತ್ತು ಗಂಟೆಗೆ ಪ್ರಾರಂಭವಾಗುತ್ತದೆ.
9. ಪರಿಶುದ್ಧ ಮನಸ್ಸಿನ ವ್ಯಕ್ತಿಯ ಒಡನಾಟ ಸಂತೋಷವನ್ನು ತರುತ್ತದೆ.
10. ಭಾರತಕ್ಕೆ ಸ್ವಾತಂತ್ರ್ಯ ಸಿಕ್ಕಿ 75 ವರ್ಷವಾಯಿತು.
11. ನಮ್ಮ ಕಣ್ಣುಗಳು ಬಹಳ ಸೂಕ್ಷ್ಮವಾದ ಅಂಗವಾಗಿದೆ.
12. ಅರಬ್ಬೀ ಸಮುದ್ರ ಭಾರತ ದೇಶದ ಪಶ್ಚಿಮ ದಿಕ್ಕಿನಲ್ಲಿದೆ.
13. ನಮ್ಮ ರಾಷ್ಟ್ರಧ್ವಜದಲ್ಲಿ ಮೂರು ಬಣ್ಣಗಳಿವೆ.
14. ಹಗಲಿನಲ್ಲಿ ಸೂರ್ಯನಿಂದ ಭೂಮಿಗೆ ಬೆಳಕು ಸಿಗುತ್ತದೆ.
15. ಮೈಸೂರು ಜಿಲ್ಲೆಯು ಪ್ರವಾಸಿ ತಾಣವಾಗಿದೆ.

### ದುಃಖದ ಭಾವನೆ

1. ನನಗೆ ಹಾವು ಕಂಡರೆ ತುಂಬಾ ಭಯ.
2. ಜಾತ್ರೆಯಲ್ಲಿ ನನ್ನ ಹಣ ಕಳೆದು ಹೋಯಿತು.
3. ಉಡುಪಿ ಹಾಗೂ ಮಂಗಳೂರಿನಲ್ಲಿ ರಣಬಿಸಲು ಇದೆ.
4. ಸುನಾಮಿ ಪ್ರವಾಹದಲ್ಲಿ ಸಾವಿರಾರು ಜನ ಕೊಚ್ಚಿ ಹೋದರು.
5. ಬರಗಾಲದಿಂದ ನಮ್ಮ ಊರಿನ ಕೆರೆ ಬತ್ತಿ ಹೋಯಿತು.

6. ಹತ್ತಿಯ ರಾಶಿ ಬೆಂಕಿಯಿಂದ ಸುಟ್ಟು ಹೋಯಿತು.
7. ಚಿನ್ನದ ಬೆಲೆ ಗಗನಕ್ಕೇರಿದೆ.
8. ಸ್ಪರ್ಧಾತ್ಮಕ ಪರೀಕ್ಷೆಗಳಲ್ಲಿ ಅವ್ಯವಹಾರ ನಡೆಯುತ್ತಿದೆ.
9. ನನ್ನ ಅಜ್ಜಿ ಅನಾರೋಗ್ಯದಿಂದ ನರಳುತ್ತಿದ್ದಾರೆ.
10. ನನ್ನ ಮನೆಯ ಪರಿಸ್ಥಿತಿಯಿಂದ ವಿದ್ಯಾಭ್ಯಾಸ ಮುಗಿಸಲು ಸಾಧ್ಯವಾಗುತ್ತಿಲ್ಲ.
11. ನನ್ನ ಕೆಲಸಕ್ಕೆ ನಾನು ರಾಜೀನಾಮೆ ಕೊಟ್ಟೆ.
12. ವೃದ್ಧಾಶ್ರಮದಲ್ಲಿದ್ದು ನಾನು ಖುಷಿಯಾಗಿದ್ದೇನೆ.
13. ಕಷ್ಟದ ಸಂದರ್ಭದಲ್ಲಿ ಜನರು ಚುಚ್ಚಿ ಮಾತನಾಡುತ್ತಾರೆ.
14. ಬಾಲ್ಯವೆಂಬುದು ನನ್ನ ಪಾಲಿಗೆ ಕೆಟ್ಟದಾಗಿತ್ತು.
15. ಬೆಂಗಳೂರಿನಲ್ಲಿ ಪ್ರಯಾಣ ಮಾಡುವುದು ತುಂಬಾ ಕಷ್ಟ.

## APPENDIX B

### ಸಂತೋಷದ ಭಾವನೆ

1. ನನಗೆ ಸಿನಿಮಾ ನೋಡುವುದು ಅಂದರೆ ತುಂಬಾ ಇಷ್ಟ.
2. ನನಗೆ ಸಿಹಿ ತಿಂಡಿಗಳು ಅಂದರೆ ತುಂಬಾ ಇಷ್ಟ.
3. ನನಗೆ ಅಣ್ಣಾವು ಸಿನಿಮಾ ನೋಡೋಕೆ ಇಷ್ಟ.
4. ನನ್ನ ಬಾಲ್ಯದ ದಿನಗಳು ತುಂಬಾ ಚೆನ್ನಾಗಿತ್ತು.
5. ನನಗೆ ಸಂಗೀತದಲ್ಲಿ ಪ್ರಥಮ ಬಹುಮಾನ ಸಿಕ್ಕಿದೆ.
6. ಅಮ್ಮನಿಗೆ ನನ್ನ ಸಂಬಳದ ಹಣದಲ್ಲಿ ಸೀರೆ ತೆಗೆದು ಕೊಟ್ಟೆ.
7. ನನ್ನ ಮಗ ತುಂಬಾ ಚುರುಕಾಗಿದ್ದಾನೆ.
8. ನನ್ನ ವೃತ್ತಿಪರ ಗೆಲುವಿನಿಂದ ಅಪ್ಪ ಅಮ್ಮನಿಗೆ ಖುಷಿಯಾಗಿದೆ.
9. ತಾಜ್ ಮಹಲ್ ನೋಡೋಕೆ ತುಂಬಾ ಚೆನ್ನಾಗಿದೆ.
10. ಅಣ್ಣ ನನಗಿಷ್ಟವಾದ ಪಾನಿಪೂರಿ ತಂದುಕೊಟ್ಟಿದ್ದಾನೆ.

### ತಟಸ್ಥ (ಯಾವುದೇ ಭಾವನೆ ಇಲ್ಲದ) ಭಾವನೆ

1. ನನ್ನ ಬಸ್ಸು 10 ಗಂಟೆಗೆ ಇದೆ.
2. ಚಿತ್ರದುರ್ಗ ಜಿಲ್ಲೆಯು ಕಲ್ಲಿನಕೋಟೆಗೆ ಹೆಸರುವಾಸಿಯಾಗಿದೆ.
3. ಅವಳು 10 ವರ್ಷಗಳಿಂದ ಸಂಗೀತ ಕಲಿಯುತ್ತಿದ್ದಾಳೆ.
4. ಗಣೇಶನು ಶಾಲೆಗೆ ಹೋದನು.
5. ನನ್ನ ಕೆಲಸ ಒಂಬತ್ತು ಗಂಟೆಗೆ ಪ್ರಾರಂಭವಾಗುತ್ತದೆ.
6. ಮೈಸೂರು ಜಿಲ್ಲೆಯು ಪ್ರವಾಸಿ ತಾಣವಾಗಿದೆ.
7. ಭಾರತಕ್ಕೆ ಸ್ವಾತಂತ್ರ್ಯ ಸಿಕ್ಕಿ 75 ವರ್ಷವಾಯಿತು.

8. ನಮ್ಮ ಕಣ್ಣುಗಳು ಬಹಳ ಸೂಕ್ಷ್ಮವಾದ ಅಂಗವಾಗಿದೆ. ನಮ್ಮ ರಾಷ್ಟ್ರಧ್ವಜದಲ್ಲಿ ಮೂರು ಬಣ್ಣಗಳಿವೆ.
9. ಅರಬ್ಬೀ ಸಮುದ್ರ ಭಾರತ ದೇಶದ ಪಶ್ಚಿಮ ದಿಕ್ಕಿನಲ್ಲಿದೆ.
10. ನಮ್ಮ ರಾಷ್ಟ್ರಧ್ವಜದಲ್ಲಿ ಮೂರು ಬಣ್ಣಗಳಿವೆ.

### ದುಃಖದ ಭಾವನೆ

1. ಜಾತ್ರೆಯಲ್ಲಿ ನನ್ನ ಹಣ ಕಳೆದು ಹೋಯಿತು.
2. ಉಡುಪಿ ಹಾಗೂ ಮಂಗಳೂರಿನಲ್ಲಿ ರಣಬಿಸಲು ಇದೆ.
3. ಬರಗಾಲದಿಂದ ನಮ್ಮ ಊರಿನ ಕೆರೆ ಬತ್ತಿ ಹೋಯಿತು.
4. ಹತ್ತಿಯ ರಾಶಿ ಬೆಂಕಿಯಿಂದ ಸುಟ್ಟು ಹೋಯಿತು.
5. ಸ್ಪರ್ಧಾತ್ಮಕ ಪರೀಕ್ಷೆಗಳಲ್ಲಿ ಅವ್ಯವಹಾರ ನಡೆಯುತ್ತಿದೆ.
6. ನನ್ನ ಅಜ್ಜಿ ಅನಾರೋಗ್ಯದಿಂದ ನರಳುತ್ತಿದ್ದಾರೆ.
7. ನನ್ನ ಕೆಲಸಕ್ಕೆ ನಾನು ರಾಜೀನಾಮೆ ಕೊಟ್ಟೆ.
8. ವೃದ್ಧಾಶ್ರಮದಲ್ಲಿದ್ದು ನಾನು ಋಷಿಯಾಗಿದ್ದೀನಿ.
9. ಕಷ್ಟದ ಸಂದರ್ಭದಲ್ಲಿ ಜನರು ಚುಚ್ಚಿ ಮಾತನಾಡುತ್ತಾರೆ.
10. ಬಾಲ್ಯವೆಂಬುದು ನನ್ನ ಪಾಲಿಗೆ ಕೆಟ್ಟದಾಗಿತ್ತು.

**APPENDIX C**

**अखिल भारतीय वाक् श्रवण संस्थान, मैसूरु - 570 006**  
**ALL INDIA INSTITUTE OF SPEECH & HEARING: MYSORE – 6**  
**वाक् भाषा विज्ञान विभाग/ DEPARTMENT OF SPEECH-LANGUAGE**  
**SCIENCES**

**Informed Consent Form for Dissertation Data Collection**

**Title: Effect of dialectical variations of Kannada on Auditory-Perception of Vocal Emotions**

**Guide:** डॉ. के. येशोदा / Dr. K. Yeshoda  
 एसोसिएट प्रोफेसर इन स्पीच साइंसेज/ Associate Professor in Speech Sciences

**Candidate:** Ms. Sahana (Reg. No: P01II22S123024) II MSc (SLP), AIISH

I do hereby give consent to participate in the study titled “Effect of dialectical variations of Kannada on Auditory-Perception of vocal emotions”. I have been briefed about the aim of the study which is as follows, to investigate the effect of dialectal variations in the auditory perception of vocal emotions.

I express my whole-hearted consent to participate. I have also been informed about the approximate time of testing and understand that the procedure is purely unharmed with research benefits only. I agree to cooperate with the investigator in this study and for the project/official communication in journals/magazines/newsletter and research purposes.

Furthermore, I have been assured that there will not be any financial commitment on my part during the course of this study. It has been further stated that my identity as a participant in this study will be strictly confidential and will not be divulged without my express consent.

Having read the above, I express my voluntary consent for my participation in this study.

Sl. No.	Name and address with phone #	Signature with date