## AFFECTIVE PROSODY IN CHILDREN AND YOUNG NEURO-TYPICAL LISTENERS FOR MALAYALAM LANGUAGE

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**ABSTRACT**

Affective prosody would refer to the perception of the emotional state of a speaker based on the prosodic aspects of one's speech. The affective prosody is often studied in individuals with right hemisphere damage or non-native speakers solely because the perception of affective prosody is localized to the right hemisphere and the non-native speakers are reliant on affective prosody as they are deprived of linguistic prosody. The current study was carried out with the aim of investigating if the affective prosody varies as a function of age. The study was carried out on two groups of non-native speakers of Malayalam of 8-12 years and 18-25 years respectively. Different sentence types were presented to these participants in auditory modality and the results showed that the performance of participants in the age range of 18-25 years performed better compared to individuals of the age-range 8-12 years showing that the development of affective prosody would show a developmental trend.

**Keywords**: Linguistic prosody, perception, Affective, Emotion, Recognition.

## 1. INTRODUCTION

Native speakers of a given language would be able to understand the basic emotions of sentences presented in their language by the virtue of linguistic content context and non-linguistic factors. The same emotions can be understood by a non-native speaker by considering the facial expressions, body language and some-times through the context also. The former is called linguistic prosody while latter is called affective prosody. Prosody can be colloquially equated to the speech melody, corresponds the modification of frequency, intensity or duration for inducing change in stress, rhythm and prosody. In adjunct to this,  the speakers' intentions or emotional state.(Pichon & Kell, 2013) would also matter. Prosody is derived from the Greek 'prosodia', meaning 'sung to music' (Belyk & Brown, 2013).The linguistic and affective prosody is often investigated in individuals with left hemisphere damage and right hemisphere damage.

According to studies, the neural correlate of prosody would activate the regions of basal ganglion on both sides, portions of the limbic regions, temporal pole, and deep rooted insular structures for the production of emotional prosody and also the auditory feedback-related processing, activated in parallel with the actual production of prosody ( Bradley & Long, 1994) As far as neuro-typical population is concerned, it is often investigated in child-directed speech or mother ease (Fernald, 1992) and in native versus non-native speakers of the language (Defran etal, 2018)The notion of studying linguistic and affective prosody in native versus non-

native speakers is that the non-native speakers are deprived of linguistic information and are reliant on the affective prosody for decoding emotions of the speaker. There is a notion that the affective prosody develops by the age of 5 and children as young as this age and above this age are able to decode the emotions through affective prosody (Dricu & Frühholz, 2020) However, there are contradictory notions (Pichok & Hicken, 2013) who believe that children may not be able to understand the emotions solely through affective prosody.

Affective prosody would refer to the speaker's emotional or affective state and can be acoustically correlated with the concurrent changes in pitch height and loudness, the affective prosody would also account the subtle variations in the acoustic features disambiguating the emotional states. Emotional expressions can take the form of 'affect bursts' this weighs more on the affective meaning than the literal meaning conveyed by the actual word (e.g. 'Yuck!'). Affective prosody conveys a broad variety of emotional states that can be recognized regardless of the cultural variables, much like facial expressions . Linguistic prosody uses the peripheral acoustic changes like variation in the in the pitch conture and/or loudness to signal features like word stress, it can also affect the perception of sentences (categorised to interrogative, imperative, declarative and exclamatory sentences). The standard intonational melodies can be seen in the child directed speech, reflected in the conversation between an adult and child. The conventions of linguistic prosody would vary as a function of language and stand as a pivotal contributor to the melody and rhythm of speech. This can be deemed as one of the reasons for the dispersion of standard prosody and would be perceived as foreign accent likely (Belyk & Brown, 2013).

The development of linguistic prosody has been investigated thoroughly however the same cannot be generalised with respect to affective prosody. There is a clear sparsity as far as this area of research is concerned. In addition to this there is a mixed findings as far as the ability of non-native children to make judgments based on affective prosody equivalent to that of adults, the current study was undertaken with the aim of comparing the ability of children and young neuro typical adults on a judgment task based on affective prosody. The current study aims to compare the performance on affective prosody judgment tasks for Malayalam language in children and adults and also want to see how the linguistic and affective prosody varies between children and adults.

## 2. METHODS

The methodology of this study followed the guidelines of Biobehavioural research and ethical guidelines of the host institute. Consent was obtained from all participants for both the adult and children group before enrolling them into the study.

### 2.1 Participants

The participants of the study were divided into two groups, the first Adult group comprised of 20 young neuro typical speakers in the age range of 18-25 years while the second group comprised of 20 children in the age range of 8-12 years.

Participants of both the groups did not have any history of any sensory, cognitive and communicative problems. The participants were selected through convenient sampling. All the participants were native speakers of Kannada and the targeted language Malayalam (the language in which the stimulus for the judgment task was administered) was non-native language for the participants and the exposure to Malayalam was minimal in the participants of both the groups Affective prosody judgment tasks was administered on the participants of both the groups.

## 2.2 Stimulus

The stimuli for the study included 6 statements each for Interrogative, Declarative and exclamatory, in Malayalam which were generated ( audio recorded) and presented to the subjects auditorily in a random order. In addition to this, 3 trial stimuli were also provided in prior. The stimuli was presented through auditory modality and had different intonation patterns for instance the interrogative sentence had rising intonation pattern, declarative had flat intonation contour and the exclamatory sentence had a falling intonation contour.

## 2.3 Instruction

"I am going to present some sentences through this headphone/earphone . You have to listen it carefully and based on the expression that you are getting understand from the auditorily presented sentence , try to categorize it as sentence of a question or a statement  or as an exclamation .There is no judgement will be happen based on your response. If you do not have any clarifications, shall we start?"

## 2.4 Procedure

The participants were asked to listen to pre-recorded one audio sample which consist of sentence stimuli of interrogative or declarative or exclamatory sentence, and simultaneously were asked to make judgment on sentence type, by pointing to the appropriate smiley corresponding to the emotions.

The sentences were in Malayalam language which were presented to the non-native speakers of Malayalam language, and each correct response fetched a score of 1 while the incorrect response was given a score 0. The maximum score was 18.

## 3. RESULTS AND DISCUSSION

The median scores for the group 1 and group 2 participants were calculated and compared. The group 1 participants secured a score of 14 (5,5 and 4 for the interrogative, exclamatory and declarative sentences respectively). While the group 2 participants secured a score of 8 (3, 3 and 2 for the three sentence types as mentioned above).

**Figure 1***: Performance of children and young neuro-typical speakers on various sentence types*
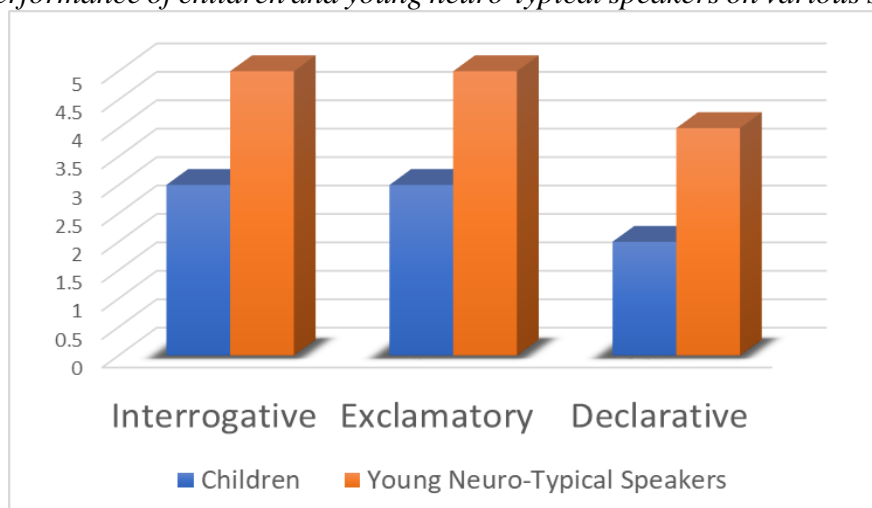


In order to verify if there was any significant difference between the median scores of group 1 and group 2 participants, Mann Whitney U test was used. The statistic was chosen as the data did not abide by the properties of normal distribution. As evident on Shapiro-Wilks test of normality ($p < 0.05$). The results on Mann Whitney U test yielded a composite Z score of 3.14

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(p<0.01) and the corresponding p values showed a highly significant difference between the two groups.

The current study assessed the judgment abilities in young neuro-typical adults and children for affective prosody. 18 sentences belonging to interrogative, exclamatory and declarative types were considered and the sentences were recorded and presented in Malayalam (the non-native language of the participants). The task of the participants was to judge the sentences based on the affective prosody, the results showed that there was a clear distinction between the young neuro typical participants and children with the young-neuro-typical participants showing a clear upper-hand in performance. This finding was in consonance with the findings of Defren et al 2018 who believe that children may not be able to understand the emotions solely through affective prosody.

## 4. CONCLUSIONS

The study was carried out with the aim of comparing the performance on sentence based on affective prosody in  young-neuro-typical participants with children. The results showed that children between 8-12 years were not able to match the performance of young-neuro-typical adults in the age range of 18-25 years showing that the development of affective prosody may follow an exponential trend and may not be complete by the age of 12 years. While young neuro typical adults were also non-native speakers and did not have much exposure to Malayalam however there were able to perform relatively well by the virtue of affective prosody.

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