

A Synthetic Test of Intonation Patterns

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Suprasegmental are properties of speech that have a domain larger than a single element and include stress, intonation, rhythm and quantity. Of these, intonation is an important mediator in interaction situations. It improves speech recognition and is the primary means of segmenting the relatively continuous speech signal.

This study was aimed to develop a synthetic test of intonation patterns in order to overcome the limitation of the T-TRIP (lack of control over frequency). Furthermore, this study was focused at understanding the performance of children aged 4-8 years in imitating these synthesized intonation patterns.

A total of 30 intonation patterns (GRL3, GRL4, SRL3, SRL4, GFB1, SFL1, GR3 GF, SR3 GF, FR3 SF, SR3 SF, GR4 GF, SR4 GR, GR4 SR, SR4 SF, GFGR3, GFSR3, SFGR3, SFGR3, SFGR3, GFGR4, GFSR4, SFGR4, SFGR4, GFGR3, GFSR3 S, SFGR3 S, SFGR3 S, GFGR4 S, GFSR4 S, SFGR4 S, AND SFGR4 S) were synthesized, out of which 5 were repeated for test retest reliability measures. The acoustic features used to generate the syllable /ba/ were based on spectrographic analysis (Savithri, 1989); which formed the stimulus. The stimuli were synthesized using parameters based on the software developed by voice and speech systems (Anantapadmanabha et al 1987).

Three normal hearing subjects (aged 23, 24 and 44 years) listened to these intonation patterns and transcribed these stimuli in terms of steepness, level and combinations of patterns. The scores were tabulated to determine patterns that were better identified and those that were not. The coefficient of correlation between judges was determined between judges 1 and 2, 2 and 3, 1 and 3 respectively by rank correlation. Furthermore, the average percentage score was calculated for each synthetic pattern.

Twenty normal Kannada speaking children (4-8 years) with 5 children each in the four age groups were selected for the study. Each child had to imitate the thirtyfive patterns which were audio-recorded. The synthesized stimuli and the imitated responses were compares by two speech-language pathologists and a rank correlation test was applied to find the correlation between the judges. All these data were tabulated to findout the emerging pattern of intonation in children.

The results indicated that no single pattern was identified completely in its level/steepness and patterns and steadiness by the three normal adult judges.

The pattern, GFSR 3 was identified the best of all the synthetic stimuli and the patterns GRL3, SRL3 and SFL1 were not properly identified even by a single judge. The remaining stimuli fell in between this range. The efficient of correlation was found to be high between judges being 0.6, 0.6 and 0.58 between judges 1 and 2, 2 and 3 and 1 and 3 respectively. Regarding the imitation of intonation patterns by children, it was observed that the ability of the children to imitate the intonation patterns increased from 4-7 years and declined thereafter. The co-relation coefficients between judges J1, and J2 using the rank difference method for the age ranges were high being 0.89 (4-5 years); 0.89 (5-6 years); 0.91 (6-7 years); and 0.85 (7-8 years). It was also noticed that children imitated single and combined intonation patterns earlier than the combined and steady intonation patterns and no difference between males and females in terms of imitation capacity was noticed.

Conclusively since not all 35 stimuli were identified by adult normal hearing listeners themselves this cannot be considered as a test. Modifications of these in either the temporal dimensions/levels need to be made. Also non-linear types of patterns need be synthesized and their effects studied. On modifications and further deletion of patterns (like SFL1, SFGR3, SFGR4 S) a test could be constructed.