

# Acoustic Perception Features in Normal Hearing Adults and Children

(Ciri-ciri Persepsi Akoustik di kalangan Dewasa dan Kanak-kanak yang Berpendengaran Normal)

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## ABSTRACT

Psychophysical studies are elemental ways to describe sound perception which includes the identification of perceptual differences in children, young and older adults. This study summarizes various psychophysical abilities with aims to provide better understanding in the perceptual development of normal hearing subjects. This study investigated frequency resolution, frequency discrimination and temporal resolution abilities in two age groups (adults and children). These groups consist of 20 normal hearing adults (mean + SD: 31.4 + 9.0 years) and 10 normal hearing children (mean + SD: 78.8 + 25 months) with behavioural thresholds of  $\leq 10$  dBHL at octave frequencies between 250 Hz and 4 KHz. Frequency resolution test using the notched noise masking technique showed the children's group had significantly larger filter bandwidths as compared to the adult group (One-way ANOVA:  $F = 27.61$ ,  $p < 0.001$ ). Temporal Modulation Transfer Function (TMTF) at modulation frequencies 10 Hz, 50 Hz and 150 Hz obtained from adults were significantly lower as compared to the children's group also indicating an age related effect. (One-way ANOVA: 10 Hz:  $F = 23.44$ ,  $p < 0.001$ ; 50 Hz:  $F = 26.84$ ,  $p < 0.001$ ; 150 Hz:  $F = 259.34$ ,  $p < 0.001$ ). Pearson  $r$  correlations also showed significantly strong negative linear correlation between age across all test modulation frequencies (10 Hz:  $r = -0.64$ ,  $p < 0.001$ ; 50 Hz:  $r = -0.66$ ,  $p < 0.001$ ; 150 Hz:  $r = -0.92$ ,  $p < 0.001$ ). Frequency discrimination tests at 500 Hz and 4000 Hz showed no significant difference between groups (One way ANOVA: *Difference Limen of Frequency* (DLF) 500 Hz:  $F = 1.64$ ,  $p = 0.21$ ; DLF 4000 Hz:  $F = 2.13$ ,  $p = 0.156$ ). Pearson  $r$  correlation also showed no significant linear correlation between groups for both frequency difference limen tests (DLF 500 Hz:  $r = -0.235$ ,  $p = 0.211$ ; DLF 4000 Hz:  $r = -0.503$ ,  $p = 0.074$ ). In summary, the coding processes of auditory information are different in adults and children and maturity of some processes may take place later in life and even declines at some point of age. With addition of hearing impairment, outcome of a successful rehabilitation programme can be affected.

*Keywords: Acoustic perception, Normal hearing, Adults, Children*

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