

Auditory Channel Capacity for Pitch and Loudness in Normal Hearing Adults and Children*

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The present study consisted of finding auditory channel capacity for pitch and loudness in 38 subjects (19 subjects for pitch and 19 subjects for loudness). Among the 19 subjects, 5 subjects were children—the remaining 14 subjects were adults.

All the subjects were first screened at 20 dB HL (ISO 1964) to ensure normal hearing.

The auditory channel capacity for loudness was found at 1 KHz. Testing was done at 4, 6, 8 and 10 events, intensity varied from 365 dB SPL to 126.5 dB SPL with 10 dB difference between successive numbers—the input information values were 2 bits, 2.585 bits, 3 bits and 3.322 bits respectively. Amount of information transmitted at each of the input information value was calculated.

The auditory channel capacity for pitch was done at 60 dB HL (ISO standard), with frequency ranging from 125 Hz to 10 KHz. The test was administered at input information values of 2, 2.585, 3 and 3.322 bits. Amount of information transmitted was calculated at each input information value.

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Auditory channel capacity is the amount of transmitted information which does not increase even with increase in input information or channel capacity in the maximum amount of information transmitted.

The study was designed to find out whether males and females differ significantly in auditory channel capacity for pitch and loudness and also to find out whether the auditory channel capacity for pitch and loudness would be same or different. In addition to the above, the study was conducted to throw light on the influence of age on auditory channel capacity for pitch and loudness.

Conclusions

The following are the conclusions of the present study :

1. The auditory channel capacity of adults for pitch was found to be around 2.3 bits, and the auditory channel capacity of children for pitch was around 2.1 bits.

There is a significant difference between adults and children with regard to auditory channel capacity for pitch at both 0.05 and 0.01 levels of significance.

2. There is significant difference between males and females with regard to auditory channel capacity for pitch at 0.05 level.
3. The auditory channel capacity of both adults and children for loudness was around 2.1 bits and there was no significant difference between adults and children.
4. There was no significant difference between males and females with regard to auditory channel capacity for loudness.
5. There was significant difference between auditory channel capacity for pitch and auditory channel capacity for loudness in adults at both 0.05 and 0.01 levels.
6. There was no significant difference between auditory channel capacity for pitch and auditory channel capacity for loudness in children at both 0.05 and 0.01 levels.

Limitations

1. More number of subjects could not be tested because of limited time available for dissertation study.
2. Test-retest reliability could not be done.

Recommendations for Further Research

1. The same experiments may be repeated with more number of subjects to corroborate the findings of the present study.
2. Auditory channel capacity for pitch and loudness may be determined in old people above 50 years of age.
3. Auditory channel capacity may be determined in mild to moderate sensorineural hearing loss cases.
4. Multidimensional stimuli may be used to determine auditory channel capacity (e.g., speech stimuli, by varying both pitch and loudness).