

PERCEPTION OF SELECTED MUSICAL INTERVALS IN FULL FREQUENCY RANGE

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Background

Perception of musical intervals at very low and very high frequencies required thorough investigation. The same concerned the relation between ratio-pitch scale and octave interval.

Aims

The aim of the research was to estimate across full frequency range the sizes and accuracy of selected musical intervals imprinted in long-term memory of musicians. Another aim was to estimate how far doubling and halving pitch by musicians and non-musicians coincide with an octave interval.

Method

In Experiment 1, twelve musicians tuned 10 times in random succession the pure-tone, upward-directed, context-free melodic intervals of a prime, a major second, a pure fifth, and an octave. This task was replicated at random order in 9 octave frequency ranges within 32-12.000 Hz.

In Experiment 2, sixteen musicians and ten non-musicians in 9 octave registers produced melodic pitch distances in two ways: (a) the pitch of the second tone doubled or halved the pitch of the first tone, (b) the second tone was an octave higher or lower than the first one.

Results

Melodic octaves are enlarged by about 12 cents across lower-tone frequencies 63-500 Hz. At 32 and 1000 Hz the enlargement is about 15 cents and at 2 kHz grows to 25 cents. At 4 and 6 kHz octaves are decreased by nearly 50 cents. Melodic fifth is constantly increased and major second constantly decreased. Doubling pitch means tuning an interval within the category of an octave.

Conclusions

1. As a result of present and previous research it may be concluded that octave enlargement is a part of general psychological tendency to increase large intervals like 5ths, 6ths, 7ths and 9s.
2. The observation that doubling pitch means tuning an octave has serious consequences for psychological scale of pitch.