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Selection of a typical human subject for binaural recording

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1. Introduction. A previous study has shown that a localization performance identical to that of real life can be obtained with individual binaural recordings [1]. The investigation was carried out as an identification experiment with 19 loudspeakers placed in various directions relative to the subject seated in a listening room according to IEC 268-13. The same investigation showed that if non-individual recordings are used, performance deteriorates, most obviously seen for the sources in the median plane. The present investigation was carried out to show whether improved results can be obtained, if the non-individual recordings originate from a selected, typical human subject.

2. Method. The setup was the same as in the previous investigation. 20 subjects participated in three experiments: A) Real life listening, B) listening to recordings made at the entrance to the blocked ear canal of 30 randomly chosen humans, and C) listening to the recordings from one selected human, the selection being based on the results of exp. B. The binaural recordings in exp. B and C were reproduced via an FEC headphone [2], equalized individually for each listener to a flat frequency response when measured at the blocked ear canal.

3. Results. A total of 9% directional errors were observed in real life (exp. A). With recordings from randomly chosen humans (exp. B), a total of 21% directional errors were seen, ranging from 15-27% depending on "recording head". The recording head that gave the lowest number of directional errors (subject AVH) was used for exp. C, where a total of 12% directional errors were seen. It is concluded that considerable improvements can be obtained by proper selection of recording head geometry.

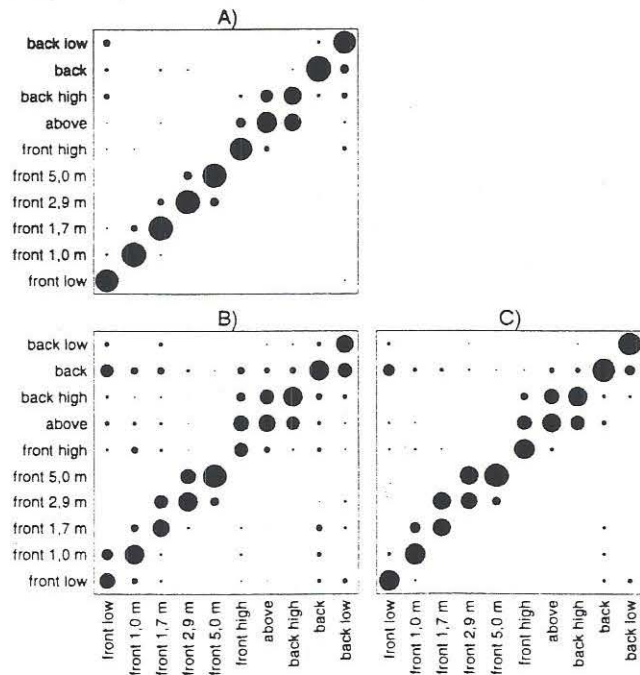


Figure 1. Response (ordinate) versus stimulus (abscissa) for the median plane sources for A) real life, B) binaural recordings from random subjects, and C) binaural recording from a selected subject (AVH).

References

[1] H. Møller, D. Hammershøi, C. B. Jensen, M. F. Sørensen "Binaural Technique: Do we need individual recordings?", submitted for publication in J. Audio Eng. Soc.
[2] H. Møller, D. Hammershøi, M. F. Sørensen, C. B. Jensen (1995) "Transfer Characteristics of Headphones Measured on Human Ears", J. Audio Eng. Soc., vol. 43, 203-217.