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PERCEPTUAL EVALUATION OF HIGH-END LOUDSPEAKERS USING PROJECTIVE MAPPING: ASSESSING THE METHOD PERFORMANCE AND THE INFLUENCE OF SENSORY EXPERTISE

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Background and aims
Rapid sensory profiling methods have recently been investigated in the audio industry as potential alternatives to conventional descriptive analysis [1]. Projective mapping (PM) is a rapid sensory evaluation method that requires assessors to sort a set of stimuli in a two-dimensional surface according to perceived inter-differences. The present study [2] introduces PM for perceptual evaluation of audio products and presents an application of the method for perceptual evaluation of high-end loudspeakers. Furthermore, a comparison of the performance of assessors with different degrees of expertise is performed.

Method
The sound of the loudspeakers was reproduced through headphones using an auralization system. The music material consisted of a set of 5 tracks selected by a tonmeister to cover a wide range of genres, dynamics, spatial, and timbral properties. The test stimuli consisted of 25 loudspeaker-track combinations, which were evaluated in blind condition by a panel of experts (N=20) and a panel of naïve assessors (N=51) using the PM method supplemented by a short descriptive step at the end of the task. The data were analyzed by Hierarchical Multiple Factor Analysis (HMFA) to uncover the main perceptual differences between the products under test.

Results and discussion
The results showed a successful discrimination between the loudspeakers (Fig. 1) with the main differences primarily associated to bass strength and depth (Tab. 1). When considering configurations obtained separately by the expert and the naïve assessors on the first two HMFA dimensions, the RV coefficients ranged between 0.78 and 0.90 for the individual tracks, while the RV for all the tracks was 0.97 (Tab. 2), indicating a high configurational agreement. However, expert assessors provided a higher number of significant descriptors, and these were generally more precise and interpretable than those provided by the naïve assessors.

Overall, this research suggests that PM can be a useful tool for perceptual evaluation of audio products, especially valuable when time and/or budget are limited.

References