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The Measurement of 3D-Audio Experience: The "Immersive Audio Quality Inventory"

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Advances in audio reproduction from mono to stereo to the most recent 3D-audio formats were fueled by the assumption that they would improve the immersive listening experience. However, up until now no valid psychometric inventory for the objective verification of such impact hypotheses has existed. This research gap shall be bridged by the development of the Immersive Audio Quality Inventory (IAQI, say "Yuackee"). The initial item list (N = 25) in this study was derived from existing inventories applied in research on virtual reality, gaming, and spatial audio, supplemented by items extracted from historical descriptions of spatial audio effects (e.g., by Wagner or Reger). The main research aim was the psychometric evaluation of the initial item set with the objective of producing an efficient (short) scale with high psychometric quality. To this end, with headphones, participants listened to 12 short sound examples (in the formats of mono, stereo and 3D-audio with a duration of about 60 s). Participants (N = 220 valid cases) rated all 12 sound examples on the 25 items (4-point rating scale). The latent construct "immersive listening experience" was determined on the basis of probabilistic test theory (item response theory) and by means of a Many-Facet Rasch Measurement (MFRM). As a result, the specified model for the MFRM (5 facets and 3 dummy facets) showed good model fit (62.13 % explained variance). The final one-dimensional 10-item list will be presented, and potential applications will be discussed.