Singing in Different Performance Spaces: Associations between Room Acoustic and Singers Perception

Background: While the acoustic design of concert halls and other performance venues has evolved over time, the fact remains that the acoustic environments are generally designed for the benefit of the listening audiences rather than that of the performers. However, singers adapt their voice to room acoustics. The acoustic perceptions and conscious or subconscious responses are critical to the singer, because, the singer, when he is performing, cannot know what he sounds like to the people who are listening.
Objectives: This paper expands upon our current understanding of how a room's acoustic environment influences a singer's performance from the perceptions, observations, and lived experiences of performers.
Methods: The subjects were nine classically-trained singers. Subjects sang the same aria in five different performance venues. After the performance, the singers filled a questionnaire.
Questions were subdivided into five major sections that were designed to capture their perceptions of A. Overall impressions; B. Background noise levels; C. Voice support; D. Voice clarity. The following acoustics parameters were measured in the five spaces: C50 (sound clarity), EDT (perceived reverberation), IACC_late (sound envelopment), and STv (voice support).
Results: It was observed the overall impression of the room was mostly correlated with STv and IACC_late. The perception of reverberation and the noisiness were correlated with C80 and EDT. The perceived voice support and clarity were mostly correlated with STv and IACC_late.
Conclusions: This finding indicates the importance of auditory feedback in singers' performance and the need for an acoustical design that takes into account the performers perception.

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