

# **Singers' Preferences for Acoustical Characteristics of Concert Halls**

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## ABSTRACT

This study aims to illuminate a little-researched topic in acoustics: concert hall acoustics for the classical singer. It is the goal of acousticians aiding in concert hall design to create an ideal listener environment for experiencing music; to accomplish this, it is vital also to consider the performer's experience in the hall. To maximize a musician's opportunity to perform optimally is to maximize the listener's experience. While Stage Support has proven to be a useful parameter to describe an instrumentalist's auditory needs, it unfortunately cannot apply to singers, whose instruments are within their bodies. This study, in an effort to explore what is most basic about solo voice self-perception in performing spaces, has examined the preferences of classical singers in two ways. First, a survey was given to a number of experienced classical singers and their numerical and narrative responses were analyzed. Second, five concert halls were measured from the perspective of a singer on stage, and the resulting impulse responses were utilized in preference tests featuring real-time auralization of singers' vocalizations. The correlations between these subjective results, existing objective parameters, and physical hall characteristics were explored. Through the survey, it was determined that singers do believe their acoustical environment affects their ability to perform with confidence and ease. Singers require reverberation to be able to hear themselves (as they are heard by the listener) in a space, favoring materials such as wood and regarding curtains and drapes with distaste, but dislike reverberation in extreme amounts, whether too much or too little. This was corroborated by blind preference testing, which indicated a strong connection between increasing preference, increasing reverberation time, and decreasing clarity. Test subjects' preferences revealed a highly significant bimodal distribution between the five halls measured, regardless of stage location. Most preferred were Boston Symphony Hall, Jordan Hall, and Brown Hall, and least preferred were Williams Hall and Proctor's Theatre.