

**A COMPARISON OF THE EFFECTS OF
VARIED BANDWIDTH SPECULAR AND
DIFFUSIVE REFLECTIONS
ON THE PRECEDENCE EFFECT**

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ABSTRACT

Despite early reflections arriving along many trajectories, humans can localize sounds based on where the direct sound source originates. The ‘precedence effect’ describes a set of phenomena thought to be involved in this human ability to localize sound in what would otherwise be confusing reverberant environments. Acousticians often apply diffusive surfaces to remove echoes and reduce spatial variation in rooms designed for speech and music, yet the perceptual effects of these treatments are not well understood. The ability of listeners to localize sound is crucial to the success of an enclosed acoustic environment. Therefore the precedence effect under diffusive conditions bears some exploration. This psychoacoustic experiment attempts to characterize the effect of diffusion on the precedence effect. Using an acoustic pointer, lead/lag stimuli at inter-stimulus intervals ranging from 1 to 5 ms, in steps of 0.5-ms, are employed to compare listeners’ perceived lateralization of a target stimulus in the presence of a single simulated specular or diffuse reflection. Bandpass noise bursts, centered at 500-Hz, of 100-Hz, 400-Hz and 800-Hz bandwidths, (ITD $\pm 300\text{-}\mu\text{s}$) are used for all stimuli.