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Perceived plausibility of a multi-modal musical performance with introduced auditory-visual spatial and temporal mismatch

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One of the biggest problems for multi-modal virtual musical performance is that of auditory-visual mismatch. Often such performances place musicians in a dry, studio-like environment and rely on acoustic room modeling techniques to place the musician's sound in an environment more conducive to musical performance. The problem, for example occurs when the musician sounds as if he/she is in a large performance space but from a visual standpoint appears to be located in a very small studio environment. This experiment aimed to reveal the impact of such mismatches on the perceived plausibility of a multi-modal musical performance. Listeners were confronted with three contrasting musical excerpts presented in a virtual environment with varying degrees of auditory visual mismatch. In the first phase, listeners were able to adjust the acoustic modeling algorithm using the salient parameters of direct to reverberant ratio and reverberation time. As the visual space volume that the performance was presented in increased, the listeners repeatedly increased reverberation time and decreased direct to reverberant ratio. During the second phase, where varying levels of spatial and temporal mismatch were purposefully introduced, the level of repeatability and accuracy of the listening group decreased despite subjective responses indicating accurate perceived performance realism.