

Effects of musical expertise on audiovisual integration: Instrument-specific or generalisable?

During ensemble performance, musicians exchange auditory and visual signals that can help in synchronising with each other's actions. Musicians must integrate corresponding auditory and visual signals accurately to make use of them. Precision in audiovisual integration improves with increasing perceptual-motor expertise, perhaps because experts are better able to predict when the auditory effects of observed actions should occur. Performance expertise has been found to have a greater effect than visual expertise on musicians' prediction abilities during synchronisation tasks, with performers better able to synchronise with actions that fall within their own motor repertoires than with actions they have only ever observed. It is unclear whether the effects of expertise on audiovisual integration are likewise instrument-specific or generalisable across instruments, however. The present study investigated the potential instrument-specific effects of expertise on audiovisual integration. Expertise in playing a particular instrument was hypothesised to facilitate prediction of observed actions, increasing sensitivity to audiovisual asynchrony in that instrumental context. Ten-second clips were extracted from audio-video recordings of clarinet, piano, and violin performances, and presented to highly-skilled clarinetists, pianists, and violinists. Clips either maintained the audiovisual synchrony present in the original recording or were modified so that the video led or lagged behind the audio. Participants indicated as quickly as possible whether the audio and video channels in each clip were synchronised. Sensitivity to audiovisual asynchrony was assessed for each expertise group/stimulus instrument pairing by evaluating the mean point of subjective synchrony and the mean range of asynchronies most often rated as synchronised (i.e. temporal integration window; TIW). Though participants across expertise groups detected asynchronies most readily in piano and least readily in violin stimuli, pianists performed significantly better for piano than for clarinet or violin. A relationship between musical training and TIW was also observed with data pooled across stimuli. Thus, sensitivity to audiovisual asynchrony improved generally with increasing expertise, and only pianists showed facilitation for their own instrument. Sensitivity to audiovisual asynchrony was affected by musical training and the nature of sound-producing movements observed. The results suggest that, to some extent, the effects of performance expertise can be instrument-specific, though they may generalise across instrumental contexts more readily during audiovisual asynchrony detection tasks than during synchronisation tasks, when overt, precisely-timed movements are required.