

Playing visual dominance of score on the piano: Skilled motor action matters in the awareness of musical notes during binocular rivalry, only when accompanied by auditory feedback

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Previous studies in our group showed that a visual musical score viewed dichoptically with a radial grating enjoyed longer dominance durations when presented with an auditory melody congruent to that score (Kim et al., VSS 2014; Lee et al., 2015). It has also been reported that an action relevant to a visual interpretation contributes to resolve perceptual ambiguity during binocular rivalry (Beets et al., 2010; Maruya et al., 2007). In the present study, we investigated whether a skilled motor action linked tightly to one of the two rival targets affects audiovisual interaction during rivalry. Sixteen observers with varying degree of piano playing skill viewed dichoptically a musical score scrolling from right to left within a viewing window and a counter-phase flickering radial grating. The perceptual dominance of visual musical score was tracked by playing the musical notes on the midi keyboard, while the grating dominance was tracked by pressing a button on a computer keyboard. On “sound” trials, participants heard the sound of piano being played by themselves. On “no sound” trials, auditory feedback was not accompanied by keyboard playing. Results showed a positive correlation between the degree of piano playing skill and the normalized score-dominance durations, only when the auditory feedback was accompanied. Accordingly, observers were divided in two groups based on the skill. In the more-trained group ( $8.3 \pm 0.89$  years in training,  $N=8$ ), the normalized score-dominance durations with auditory feedback were distributed toward the longer side than without auditory feedback, while there was no such effect observed in the less-trained group ( $3.6 \pm 0.56$  years,  $N=8$ ). These results suggest that an execution of skilled motor action closely linked to a visual stimulus has impact on the interaction between the visual stimuli and the auditory feedback during binocular rivalry, which relies on the mastery of the motor skill.