

## Piano playing enhances awareness of musical scores during binocular rivalry

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When two dissimilar stimuli are presented dichoptically, perceptual dominance alternates between the two (Blake & Logothetis, 2002). During this phenomenon dubbed binocular rivalry, executing a simple and directly relevant action takes advantage in resolving the visual conflict (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 stimuli affects perceptual selection during rivalry when the linkage between action and perception is not concrete, but rather abstract. Seventeen skilled piano players ( $9.6 \pm 0.93$  years of training) dichoptically viewed a musical score scrolling from right to left and a vertical grating scrolling from left to right. There were three different response conditions for tracking the perceptual dominance of the musical score; In the “piano” condition, participants played the musical notes with a midi keyboard, the relevant motor action to the score. In the two control conditions, unrelated actions - pressing a computer keyboard button or discriminating the pointing direction of the stem of musical notes using two arrow keys (e.g., ‘up’ or ‘down’) - were assigned to the “binary” and “direction” conditions respectively. For all three conditions, the response tracking the vertical grating was identical, pressing a computer keyboard button. Due to the large individual variation of alternation rate during rivalry (Hancock et al., 2012), we normalized the dominance durations by dividing each score and grating dominance durations by the average of all dominance durations of each condition per participants. A repeated-measures ANOVA revealed a significant difference in normalized dominance duration of scores between the three conditions ( $p < .001$ ). Post-hoc pairwise comparison showed that score dominance in the binary condition was significantly shorter compared to both direction ( $p = .002$ ) and piano conditions ( $p < .001$ ). More importantly in the comparison between direction and piano conditions, where both tasks required the tracking of each musical notes, score dominance of the piano condition was significantly longer than that of the direction condition ( $p = .045$ ). These results suggest that during binocular rivalry skilled motor action extends the perceptual dominance of the relevant stimuli even when the action and perception are linked based on a high-level, symbolic association.