Yong Jeon Cheong (The Ohio State University)

Empty and filled rhythms: An inquiry into the different cognitive processing of vocal and instrumental rhythms and the musicological implications of rhythm memorization

Though melody and rhythm have been rarely investigated in terms of the sound that forms them, physiological and neuroimaging studies have shown that the human brain processes differently not only vocal and non-vocal sounds (Belin et al., 2000; Levy et al., 2003) but also vocal and instrumental rhythms (Hung, 2011). Klyn et al. (2015)’s behavioral study demonstrated differences in working memory between vocal and instrumental (percussion-like) rhythms. The current experiment tests whether these differences are due to differences between ‘filled’ and ‘empty’ rhythms: Vocal rhythms consist of continuous sounds whereas instrumental rhythms are a set of discontinuous sounds.

In the experiment, participants (musicians and non-musicians) listened to stimulus pairs of either vocal, filled instrumental, or empty instrumental rhythms and decided whether the two rhythms of each pair were the same or different while their reaction time (RT) and error rate were recorded.

Significant processing differences between empty and filled instrumental rhythms as well as between vocal and filled instrumental rhythms were founded. Participants showed the shortest RT with the best accuracy on empty rhythm while filled rhythm presented the longest RT with the lowest accuracy. However, participants’ performance on empty rhythm is only slightly better than vocal rhythms.

Although the contrast between 'empty' and 'filled' does not explain the processing difference between vocal and instrumental rhythms, this study improves our understanding of why various cultures use onomatopoeic sounds and notations for percussive rhythms and why pronounceable rhythm representations are advantageous for memorizing music.