How musical rhythms influence cardiac and respiratory dynamics

Shannon E. Wright1, Caroline Palmer1, Nick Greene2, and Steven Livingstone2

1McGill University, Montréal, Québec

2University of Otago, Dunedin, New Zealand

 Temporal coupling of physiological activity to musical rhythms is known to occur. Musical rhythms have been shown to influence heart rate, heart rate variability, and respiration rate. A key dimension of musical rhythms that may promote coupling of physiological activity is tempo, the rate of elements in a musical sequence. However, previous research has produced discrepant findings on the effect of musical tempo on cardiac and respiratory activity. One potential reason for this is that not all studies consider how individual differences in physiological activity may influence responses to music. Furthermore, previous research has rarely considered how musical tempo influences physiological dynamics. This talk will present a study investigating the effect of musical tempo on cardiac and respiratory dynamics. Participants' cardiac and respiratory activity was recorded while they listened to slow tempo and fast tempo classical musical excerpts as well as during a silent baseline period. Preliminary results suggest that heart rate variability was highest and respiration rate was slowest when participants heard slow tempo music. Musical tempo did not influence participants' heart rate overall, but individual differences in the direction of heart rate change were observed during the slow tempo music: Participants with slow baseline heart rates got slower and participants with fast baseline heart rates got faster. Nonlinear analyses on cardiac dynamics suggested that participants' cardiac activity became more predictable and changed more slowly when they listened to slow tempo music, but cardiac dynamics did not change between silent baseline and fast tempo music. Overall, these results indicate that musical tempo can influence cardiac and respiratory activity, with individual differences in physiological activity being an important consideration in the specific way that people's cardiac activity changes with music.