

Emotional Changes Caused by the Change in the Tempo of Fujime Daiko

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1 OBJECTIVES

Wadaiko – Japanese drum – are at times referred to as a “sport of sound.” This is because they require a mobility not seen with other instruments. Furthermore, because Japanese drum is an instrument that does not have a musical scale, the percentage in which rhythms and tempos determine the artistry in its performance is high (Yamaguchi et al., 2012). The performer experiences positive emotional expression during performance, akin to a pleasant feeling. Furthermore, the resonance of the sound during a Japanese drum performance and the vibration transmitted to the body when beating the drum become positive stimuli, aiding in releasing stress and sustaining concentrative ability. With Japanese drum, sounds are created with a hitting motion, and movement and sound stimuli from this process influence the performers’ emotions. However, studies on Japanese drum heretofore have mainly looked at the biomechanics of the hitting movement or music therapy and there have not been many studies that focused on the emotions of the performers in association with changes in rhythm and the tempo.

The objective of this study was to examine the changes that appear in the emotional state, autonomic nerve activity, and stress reaction during and after performance of fujime daiko by changing rhythm and tempo. Such changes were examined using psychological examination, heart rate variability, and saliva analysis. The change in emotional state was the main factor examined in this study.

2 METHODS

2.1 Experiment Subjects

Eight elite wadaiko performers (4 male, 4 female; mean age: 20.3±3.1 years old) were the subjects for this study.

2.2 Experimental Task

(1) Experimental Task

A Japanese drum task and a rubber tube task (control task) were set. The Japanese drum task was a performance task lasting 5 minutes, using a fujime-daiko in a sitting position (Fig. 1). The exercise involving the fitness band was 5 minutes of bending and stretching the arms, alternating between the left and the right. The actual movement for the rubber tube exercise was similar to that in the Japanese drum task. A preliminary experiment was conducted to confirm that there was no difference in heart rate or exercise intensity between the two tasks.



Figure 1: Fujime daiko performance.

(2) Tempo

Tempos of 80 and 160 were employed. The movement tempo was regulated using a metronome.

(3) Rhythm

The rhythm used was a 3-count drumbeat for the Japanese drum task and an alternating left and right movement for the fitness band task.

2.3 Measured Items

① Two-dimensional mood scale (TDMS): A TDMS was used to evaluate moods based on subjective levels of stimulation, stability, pleasantness and alertness.

② Heart Rate Variation: Electrocardiogram R-R intervals were measured in succession using a POLAR-V800 heart rate monitor. For analysis, the Lorenz plot method was used in order to infer the activities of the CSI (cardiac sympathetic index), a sympathetic nerve function index, and the CVI (cardiac vagal index); a parasympathetic nerve function index.

③ Saliva Composition: Cortisol and chromogranin A in the saliva samples were measured. The EIA method (ELISA method) was used for measuring.

2.4 Data Analysis

Statistical processing was conducted using the Friedman test, which is a non-parametric test, and Wilcoxon's t-test. The significance level was set at below 5% for both tests.

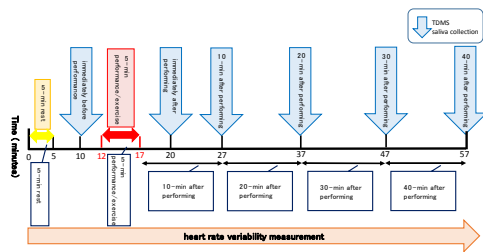


Figure 2: Summary of experiment.

3 RESULTS AND DISCUSSION

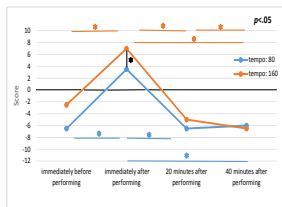


Figure 3: Stimulation level in the Japanese drum task.

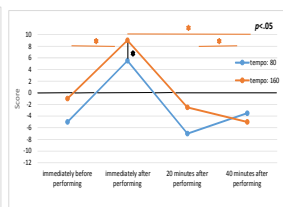


Figure 4: Pleasantness of the Japanese drum task.

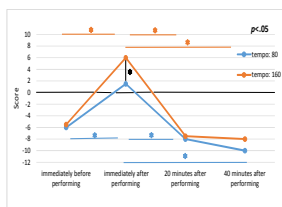


Figure 5: Alertness in the Japanese drum task.

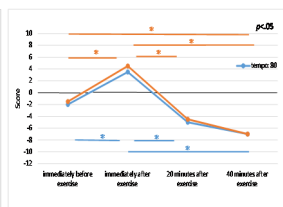


Figure 6: Stimulation level in the fitness band task.

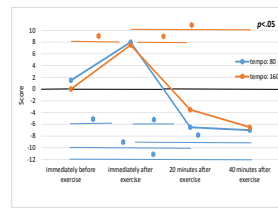


Figure 7: Pleasantness of the fitness band task.

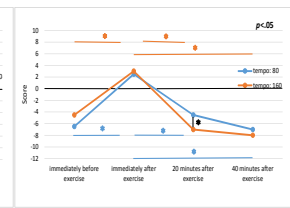


Figure 8: Alertness in the fitness band task.

Stability and alertness scores in the TDMS increased in both tasks immediately after completion of the task, except when the tempo was 80. A significant difference was seen between different tempos under the Japanese drum condition; immediately after performance in stimulation level, pleasantness, and alertness, with the three levels being higher at a tempo of 160. No difference was found between tempos in the fitness band task. It has been reported that even a transitory cardiovascular exercise will heighten positive emotions immediately after an exercise compared to during the exercise (Arai, 2000). Furthermore, there have been self-reflection reports stating that a tempo of 160 was “Strenuous but easier to get into a rhythm.” Therefore, it is believed that for highly experienced Japanese drum performers, a performance that is high in tempo and easy to get into a rhythm elicits pleasant emotions, despite the high exercise load, due to the synergy between movement and sound stimuli.

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