

TADASHI KATO, Ph.D., Department of Behavioral Science, Fairmont State University, Fairmont, WV 26554, AUDREY BECKMAN, Department of Statistics, Ohio State University, Columbus, OH, 43210, MAHMOOD HOSSAIN, Ph.D., Department of Computer Science and Mathematics, Fairmont State University, Fairmont, WV 26554, AUDRA HOLT, Department of Behavioral Science, Fairmont State University, Fairmont, WV 26554, MCKENZIE VERONICA FITTRO, Department of Behavioral Science, Fairmont State University, Fairmont, WV 26554, EMMA R. URBANIC, Department of Behavioral Science, Fairmont State University, Fairmont, WV 26554, ELIANA NICOLE WHITED, Department of Behavioral Science, Fairmont State University, Fairmont, WV 26554, and SARA LAEL CAMPBELL, Department of Behavioral Science, Fairmont State University, Fairmont, WV 26554. Natural sounds produce higher EEG hemispheric coherences than artificial sounds.

[Objective] Present study examined the hemispheric coherences of electroencephalogram (EEG) to identify the differential neurophysiological effects of natural sounds and mechanical sounds. [Procedure] Thirty-three healthy volunteers, including twenty women (24.41 ± 10.42 yrs.) and thirteen men (25.00 ± 10.04 yrs.), listened to three 1-minute-long nature-sound (ocean-wave, waterfall, rain) and three 1-minute-long artificial-sound (helicopter, rowing-boat, water-sprinkler) and their 16-channel EEGs were monitored based on EEG International 10-20 Method. [Analyses] Coherences were computed for eight hemispherically-paired channel combinations of EEGs (Fp1-Fp2, F3-F4, F7-F8, C3-C4, P3-P4, T3-T4, T5-T6, & O1-O2) by using Coherence Similarities as well as Long Common Subsequence methods. Mixed Design ANOVAs were applied by using gender as between IV, measurement stages as within IV, and above-mentioned coherence values as DVs. [Results] Significant treatment effect of T5-T6 was found for Coherence Similarity, and post-hoc-t-test with Bonferroni correction showed that T5-T6 coherence during ocean-wave and waterfall sounds were significantly higher than during helicopter sound ($P < .01$). Further, there were significant treatment effects of F3-F4 and C3-C4 for Long Common Subsequence of alpha frequency component (8-13 Hz). Post-hoc-t-test with Bonferroni correction demonstrated significantly higher coherence during waterfall sounds than during rowing-boat sound for F3-F4, and significantly higher coherence during rain sound than during water-sprinkler sound for C3-C4 ($P < .01$). [Discussion] ANOVA results suggested that exposure to natural sounds produced significantly higher EEG hemispheric coherences than did the exposure to artificial sounds. These results suggested the heightened neuronal signal transmission through corpus callosum while listening to natural sounds, which is known to be associated with meditative relaxation states of consciousness.