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## **Heart Rate Variability (HRV) biofeedback: A new training approach for operator's performance enhancement**

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### **Keywords**

heart rate variability, biofeedback, operator, cognitive performance, resonant frequency

### **Abstract**

The widespread implementation of advanced and complex systems requires predominantly operators' cognitive functions and less importance of human manual control. On the other hand, most operators perform their cognitive functions below their peak cognitive capacity level due to fatigue, stress, and boredom. Thus, there is a need to improve their cognitive functions during work. The goal of this paper is to present a psychophysiology training approach derived from cardiovascular response named heart rate variability (HRV) biofeedback. Description of resonant frequency biofeedback - a specific HRV training protocol - is discussed as well as its supported researches for the performance enhancement. HRV biofeedback training works by teaching people to recognize their involuntary HRV and to control patterns of this physiological response. The training is directed to increase HRV amplitude that promotes autonomic nervous system balance. This balance is associated with improved physiological functioning as well as psychological benefits. Most individuals can learn HRV biofeedback training easily which involves slowing the breathing rate (around six breaths/min) to each individual's resonant frequency at which the amplitude of HRV is maximized. Maximal control over HRV can be obtained in most people after approximately four sessions of training. Recent studies have demonstrated the effectiveness of HRV biofeedback to the improvement of some cognitive functions in both simulated and real industrial operators.

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