PERSON MOTIVATIONAL ACTIVITY WHEN USING THE MASTER KIT

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Abstract: The aim of the current study was to examine the motivation of human activity via the Master Kit self-regulation technique. The study of human motivational activity via the Master Kit psychological simulator, using the study of heart rate variability, showed the influence of the studied technique on the human body. The experiments were conducted on the users of the Master Kit self- regulation simulator. The test subjects were divided into 2 groups: experienced users and newcomers. The study was carried out by a 5-minute recording of HRV. As a result of the conducted experiments it was established that people who have been using the self-regulation simulator for a long time have the standard deviation of the values of the NN intervals lower than the similar index of newcomers. It is also worth noting that the revealed changes can be considered as an indicator of higher motivational activity among the experienced users of the "Master Kit" program. The study shows that the use of the "Master Kit" automated self-regulation simulator contributes to the achievement of intentions with the least amount of energy expenditure.

Key words: human motivational activity, heart rate variability, achievement of result, motivational mindset

Introduction. The regulation of body functional systems is performed by higher nervous activity, in which conditioned-reflex activity and motivational activity can be distinguished. By motivational activity we refer to activity caused by the dissatisfaction of a need.

Motivational activity is controlled by the excitation of the subcortical centers, caused by the dissatisfaction of a need and reflecting the degree of dissatisfaction degree of need, and the excitation of ascending adrenergic structures which are chemically specific to this need. The excitation of reticular formation ascending structures, which exert toning influence on the cortex, increases the reactivity to conditional and unconditional signals of the need, enhances the sensitivity of all analyzer receptors, and causes a response reaction to any incentives that contribute to the formation of exploratory and search activity to find, obtain, and use the objects of this need.

In this way, motivational activity energetically determines the selectivity of reactivity to different signal values. Even at the level of reticular formation, it determines the dominance of such activity. It inhibits conditional and unconditional reflex reactions to the signals, which do not cause the corresponding activity but is strengthened energetically by them..

Motivational nerve activity ceases to be energetically maintained with the onset of sensory satisfaction, upon which, as a result of the cessation of the toning effects on the cortex from the reticular formation, motivational activity is terminated. Motivational activity is regulated in its specific content and its architecture by the cerebral cortex.

There are various methods of studying person motivational activity: "Hierarchy of needs," "Ladder of motives," the studying of students' educational activity motives, "Motivation to avoid failures," "Motivation for success," "Motivation of success and fear of failure," "Life-purpose orientation" (LPO), and "Test of humorous phrases" (THP), to name a few. However, all these methods are psychological tests and do not show changes in the body functional systems at different levels of motivational activity.

To demonstrate alterations in the body function systems, one effective method is the study of heart rate variability, which is based on the measurement of electrocardiogram

RR-interval durations and on the formation of a dynamic set of values visually displayed in the form of a cardiointervalogram (rhythmogram).

The first studies on the impact of mental stress on human functional status using cardiovascular indicators are mentioned in the work of Dutch scientist C. Winkler [1899], who showed that the undertaking arithmetic test leads to an increased heart rate, increased blood pressure, and decreased respiratory sinus arrhythmia. The heart rate increase in response to emotional stress was mentioned in 1949 in the experiments of R. B. Malmo and C. Shagass [1949]. Dutch researcher J. W. H. Kalsbeek was the first scientist to try to use heart rate variability as an indicator of mental workload. In his studies [Kalsbeek J. W. H., Ettema J. H., 1963] a gradual decrease of RR-interval variability due to an increase in the complexity of mental tasks was found. The authors proposed using an indicator of heart rate variability (standard deviation of RR intervals: SDNN) to measure mental workload, considering the decline in the HRV when the task requirements increased. In Sykes's study in 1967, carried out under the guidance of J.W.H. Kalsbeek, the analysis of the motivation effect on the heart rate variability in the course of the execution of a mental task [Kalsbeek J.W.H., Sykes R.N., 1967] was presented. The authors established that the "motivated" group had permanently reduced levels of heart rate variability (SDNN) throughout the process of task execution. In addition, the degree of heart rate variability decrease in the "unmotivated" group was negligible at the beginning of the task and increased only during the execution.

Additionally, in a number of studies, a connection of the mental effort and requirements of a problem with the simultaneous reduction of the spectral power of heart rhythm in a frequency range of about 0.1 Hz (the so-called "0.1 Hz component," or MF-range) and in the high-frequency HF-range was observed (Aasman et al., 1987; Hyndman B.W. Gregory J.R., 1975; Itoh Y. et al., 1990; Jorna P.G.A.M., 1993; Mulder G., L.J.M., 1980; Mulder, G. & Mulder, L.J.M., 1981; Veltman, J.A. & Gaillard, A.W., 1993; Vicente et al., 1987). In the 2002 experiment by J.H. Houtveen et al., in the modeling of the mental workload (answering the intellectual questions during the parallel execution of the task against the clock), a significant decrease in the spectral power of the heart rate was established in both high-frequency (0.125 ÷ 0.5 Hz) and low-frequency (LF) ranges (0.0625 ÷ 0.125 Hz).

Based on the above-mentioned literature, the study of human motivational activity via the Master Kit psychological simulator, using the study of heart rate variability, can shed light on the influence of the studied technique on the human body.

The aim of the current study was to examine the motivation of human activity via the Master Kit simulator.

Material and research methods

The experiments were conducted using the Master Kit simulator. The test subjects were divided into 2 groups:

1. Those who had used the simulator for a long period of time (advanced users)
2. Those who had just begun to use the simulator

In both groups, the experiments were carried out during a state of rest, during transformation, and after transformation.

The research was carried out through a 5-minute HRV recording. The electrodes were put onto the limbs in the same sequence as for a standard electrocardiography (except for the thoracic electrodes). The standard 5-minute ECG recording was performed in a quiet, isolated room with a constant room temperature. The study used the parameters of temporal and spectral HRV analysis: standard deviation (SD) of normal RR-interval values (standard deviation of the NN interval, SDNN, ms), the square root of the mean squared differences of the successive RR intervals (the square root of the mean squared differences of the successive NN interval, RMSSD, ms), the percentage of successive RR intervals, the difference between which exceed 50 ms (pNN50%, ms), the power of high-frequency oscillations (high frequency, HF, ms2), the power of low-frequency oscillations (low frequency, LF, ms2), the power of very low-frequency oscillations (very low frequency, VLF, ms2), the full spectrum of frequencies characterizing the heart-rhythm variability (total power, TP, ms2), the index of vagosympathetic impact on the heart rate (LF/HF, c.u.), and the stress index (stress index, SI, c.u.).

The statistical analysis was conducted using Statistica 10.0 and Microsoft Excel 2007. The estimation of the distribution normality was carried out using the Shapiro-Wilk criterion, and the differences were determined by the Mann-Whitney criterion and Student's t-criterion.

Results

The results revealed that the standard deviation of the NN-interval values for people who have been using the technique for a long time was lower than that of the "newcomers," which indicates a high level of motivational activity associated with using the Master Kit (figure 1).

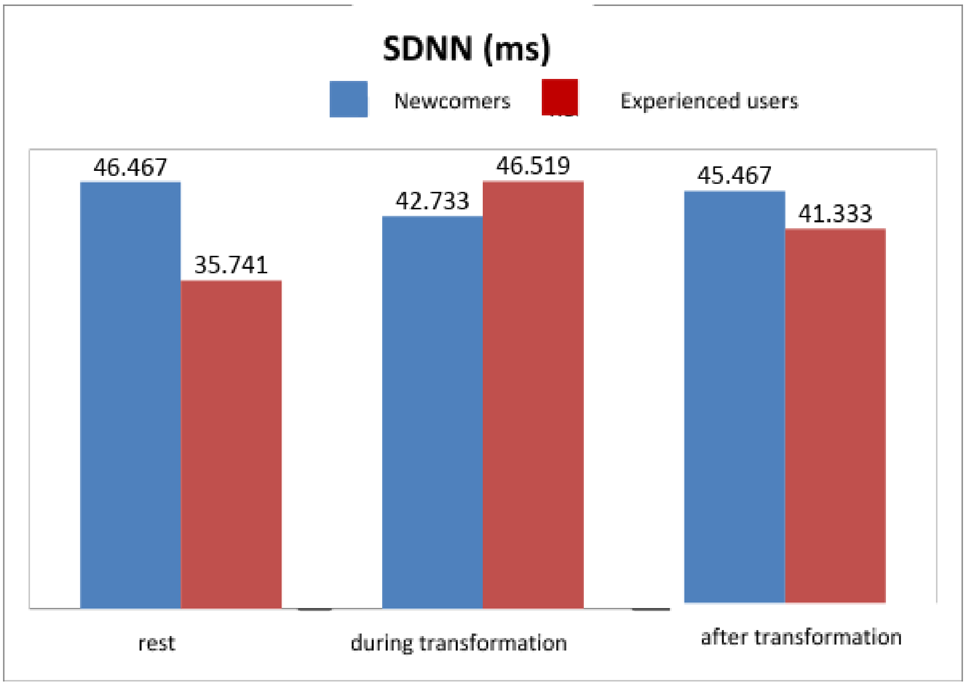

Figure 1. The SDNN (standard deviation of the NN interval) is the standard deviation of the NN-interval values in the test groups over the entire period, ms.

The spectral power of the high-frequency variability component in terms of the total power of oscillations for the "newcomers" is 22–28%. For experienced users, this figure is reduced to 15–20% and, during the training, further reduced to 12%.

The indicated changes cause the deviation in the ratio of the high-frequency and low-frequency components.

The indicated changes also indicate higher motivational activity for the "experienced" users of the Master Kit and are consistent with J.H. Houtveen et al.'s (2002) data.

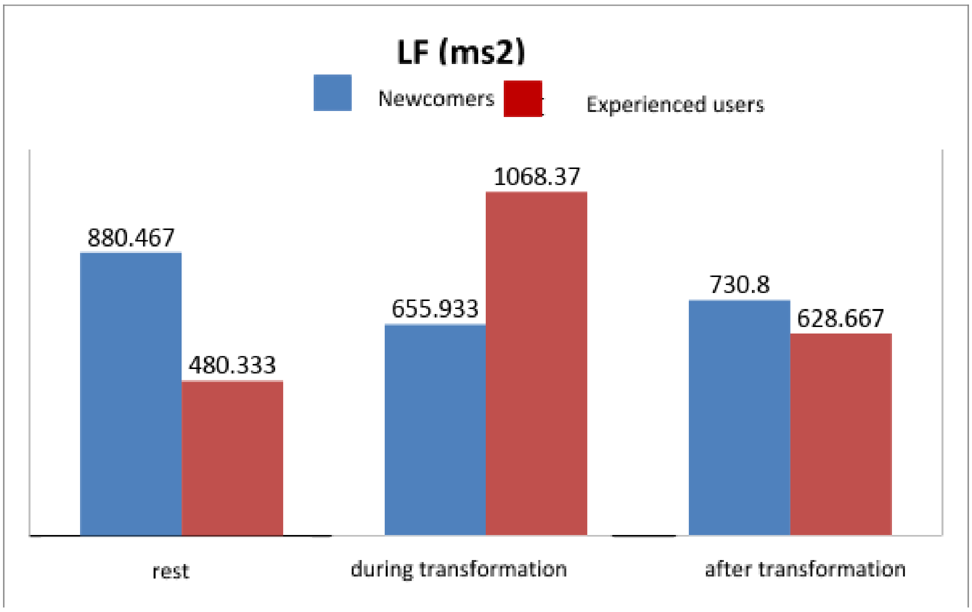

Figure 2 – LF (low frequency): power of low-frequency oscillations in the test groups, ms^2

High motivational activity triggers the production of conditional reflex reactions necessary for the solution of human problems and, consequently, for the realization of intentions.

With the beginning of action (or activity), motivation does not disappear. It remains in memory, and the purpose of action is fixed in the mechanism of its control—the apparatus of comparison, in the form of the standard, to which the achieved result ("action acceptor") is compared. When the planned result is achieved and the needs are met, the motivation loses its relevance and the prompting "here and now" loses its energy but becomes fixed in the long-term memory as an experience. The motive becomes "known," as well as its components—the needs and goals, as well as the ways to achieve them.

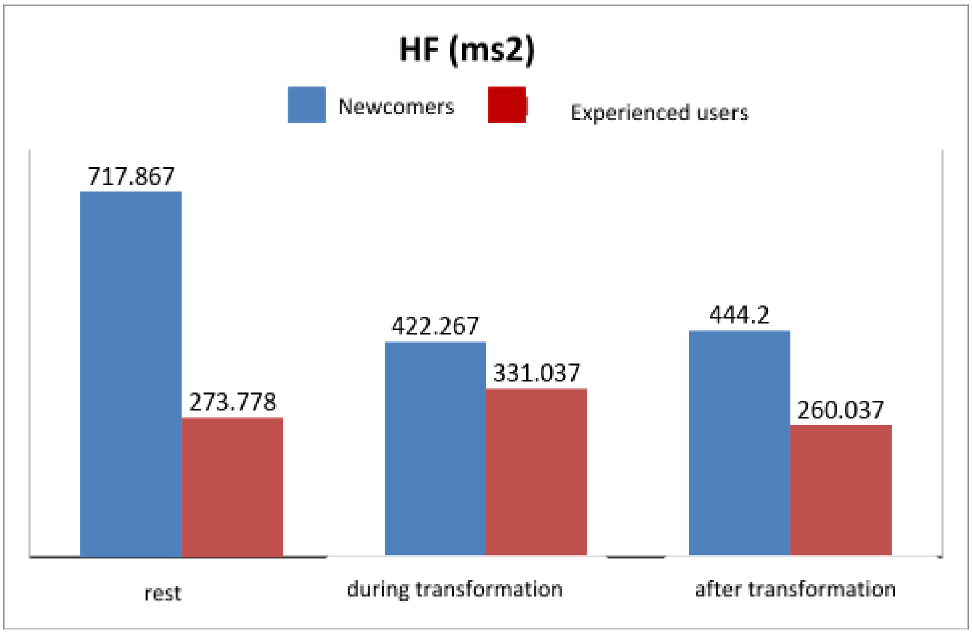

Figure 3 – HF (high frequency): power of high-frequency oscillations in the test groups, ms^2

If the goal is not achieved and the need remains unsatisfied, the consequence may be the fading of the motive or the emergence of a stronger need that suppresses the former one via the dominant mechanism. In this way, the motive is modified and transformed into a new psychological formation—a motivational setting. The longer the motive goes unrealized, the more the strength of needs, and, consequently, the motivational tension decreases. The motivational setting is a planned but delayed task, or intention, that will be carried out in the necessary situation and for the necessary motive. It can be seen as a latent state of readiness for the satisfaction of the need and the realization of intention.

Therefore, the use of the Master Kit contributes to the increase in motivational activity of the user, allowing the individual to achieve intentions and not spend a large amount of energy on formation and maintenance of the activity of the corresponding functional system. When using this technique, the need to form a motivational mindset disappears, as the intention is already realized by the mechanism of the system, enabling the formation of motivation. It also leads to a more rapid realization of intention, as no time is spent on the formation of the motivational mindset.

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