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Conscious and Unconscious Responses as Independent Components of a Person's Current Psychophysiological State

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Abstract

A person's conscious and unconscious responses are defined in reaction to the presentation of oppositional stimuli in the process of testing multiple intelligences. The unconscious response is measured with the use of vibraimage technology, which allows quantifying the psychophysiological state.

The aim of the article *is to show the feasibility of using the periodic presentation of opposite stimuli to control a person's psychophysiological state.*

Materials and methods: *Organizational, empirical, and statistical methods used for the study of 574 people aged 14 to 55 years of the humanities and classical technical specialties and from different countries. The developed methodology allows one to jointly analyze the process of conscious and unconscious responses, reducing them to a single characteristic of personality or psychophysiological state.*

Results: *It was established that conscious and unconscious responses complement each other in the absence of intercorrelation. The proven lack of correlation between a person's conscious and unconscious response to a stimulus is direct evidence of the ability to conscientiously process these reactions, which is the basis for obtaining the multiple intelligence profile. The identified dependence of psychophysiological control allows one to reconsider the practical methods of conducting interviews and surveys, as well as the prediction of abilities, lie detection, and the more effective choice of stimuli sequences when conducting profiling.*

Conclusion: *The high efficiency of the vibraimage technology demonstrates that the conscious and unconscious responses complement each other and do not correlate with each other. The cybernetic approach to a person allows bringing humanity to a new stage of evolution and understanding of its place in physical nature.*

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I. Introduction

The terms conscious and unconscious are used by various researchers in related sciences and are often understood differently; therefore, we will first give our own definitions based on a quantitative assessment of these terms as psychophysiological characteristics. In this article, a conscious response is understood as verbal or nonverbal responses to questions presented in a Yes/No format, or the absence of an unambiguous response to the given question. An unconscious response is understood as the subject's change in psychophysiological state (PPS), which is analyzed by vibraimage technology.

Vibraimage technology

Vibraimage technology (Minkin & Shtam, 2000; Minkin, 2017; Minkin, 2018) converts streaming video into two different image components, reflecting the amplitude and frequency characteristics of vibrations and movements of objects in the frame. Vibraimage technology differs from other psychophysiological detection technologies in its use of statistical processing to obtain information about a person's physiological characteristics. Traditional psychophysiological technologies use direct measurement of human physiological characteristics, such as pulse rate (Berntson et al., 1997; Baevsky & Chernikova, 2017), respiratory rate (Simoes et al., 1991; Hanson, 2014), skin electrical conductivity (Ogorevc et al., 2013), electroencephalography (Tatum, 2014) etc. for information about a person's psychophysiological state. A direct physiological signal for vibraimage technology is a video image of a human head, and informative psychophysiological parameters are determined by mathematical and statistical processing of the streaming video signal.

The amplitude and frequency components of the vibraimages are parallel video streams similar in image format to the original video signal. Each frame of the amplitude and frequency component contains temporal and spatial information about the past of this video stream, limited in time, the number of frames of frame difference accumulation. Vibraimage technology transforms these video streams into the primary parameters of the vibraimage (Minkin, 2017), which are then converted into the informative parameters of the investigated object depending on the purpose of the study. Vestibulo-emotional reflex (Minkin & Nikolaenko, 2008) is physiological reason of human head movement informativity.

The main characteristics of a person's vibraimage that informatively reflect the psychophysiological state, were suggested to consider the parameters based on the mathematical expectation and standard deviation (SD) of the vibraimage frequency component (Minkin & Myasnikova, 2018), defined across a whole or partial frame limited by the image of the subject's head. Earlier it was demonstrated that the average value of the expectation of a vibraimage characterizes a person's energy expenditure (Minkin, 2009), and the SD of a vibraimage characterizes the **i**nformation efficiency of a person (Minkin, 2018). The efficiency of any system is determined in a percentage,

and the constant coefficient was chosen so that the magnitude of the changes along the information axis (Minkin, 2018) is approximately equal to the magnitude of the changes along the energy axis for people who are in an active psychophysiological state. At the same time, for people in a depressed or any other psychophysiological state, the information coefficient of efficiency should not be negative. Since it is necessary to add only the physical quantities of the same name, then for the energy axis it is also bound to percentages or relative units. Based on accepted data on energy consumed by a person, energy consumption of 10 kcal/min is taken as 100%. Theoretically, a person's energy consumption can exceed the specified value (Gorman et al., 2014; Ceaser, 2012), but only with active human movement. The vibraimage system is designed to measure the psychophysiological parameters of a person in a quasi-stationary state, so the indicated physical units linked to percentages can be considered valid.

In this paper, we investigated the results obtained by the vibraimage technology when testing multiple intelligences (Gardner, 1983), so we will dwell on this term in more detail.

I.1 Multiple intelligences

Initially, human intellectual activity was understood as a single factor, called by Spearman (1904) and his followers as the “general” (g) factor. From this perspective, intelligence was viewed as an indivisible whole (Sternberg, 1975; Stein & Book, 2000). Gardner (1983) is an adversary of the theory of indivisible intelligence and of the test approach to the diagnosis of abilities, which in his opinion reflects the level of awareness that is positioned within the framework of a particular subculture. This framework contains the “learning/awareness” factor, but not ability parameters. At the same time, it is precisely the concept of “multiple intelligences” that allows for the exploration of the links between abilities and the methods of their implementation in various spheres of life. Gardner's multiple intelligences are equal and independent, though they also complement each other. This shows the integrity of a person’s mental organization. Each of the seven basic types of intelligence represents a certain way of interacting with one’s surroundings, reflecting a person’s abilities in a particular field of study. “It is evident that, with few exceptions, societies are not interested in “pure” intellectual competences: there are few occupational roles that the idiot savant of linguistic, logical, or bodily intelligence can perform. Rather, in nearly all socially useful roles, one sees at work an amalgam of intellectual and symbolic competences, working toward the smooth accomplishment of valued goals” (Gardner, 1983).

However, the seven-component model of multiple intelligence (MI) (in later works, the number of components cannot exceed 10–12 items (Gardner, 2008; Gardner, 2011), from practical and methodological points of view, have disadvantages, including:

a) the absence of a dominant principle for MI profile structuring as a holistic phenomenon;

b) the uncertainty of the scientific approach, objectively reflecting the principle of structuring.

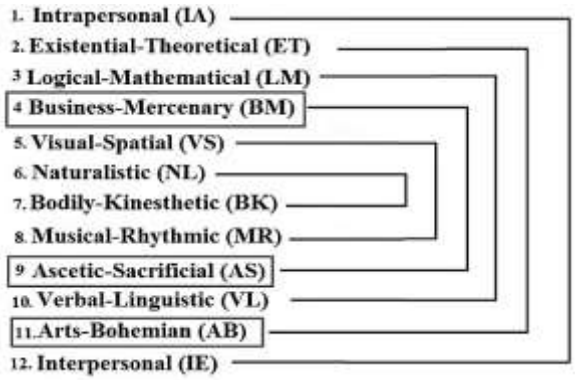

Figure 1. Structured and extended model of Gardner's multiple intelligences

The VibraMI program (Vibra MI, 2018), based on the vibraimage technology, presents Gardner's classification of multiple intelligences structured and expanded to include 12 MI types (Minkin & Nikolaenko, 2017) (Figure 1), indicating the possibility of self-realization in a certain professional field. Business-mercenary, ascetic-sacrificial, and bohemian-artistic types of MI have been added to Gardner's classification. A questionnaire consisting of 24 questions diagnoses the rating of MI types based on the psychophysiological response and the conscious answers of the subject. The resulting profile of multiple intelligences can be viewed from the perspective of an individual profile of abilities, sphere of interests, and preferences.

I.2 Review of conscious and unconscious stimulus response studies

Most research in the field of psychology and medicine analyzes the mechanisms of consciousness and the unconscious when analyzing or solving practical problems, such as the learning process (Cleeremans, 2014). Another portion of the research analyzes a person's behavior and his reaction to the presentation of individual stimuli (Eimer & Schlaghecken, 2002; Fahrenfort, 2009; Railo, 2012). Starting with the classic work of Darwin (Darwin, 1872; Dimberg et al., 2000; Janssen, 2009), much research has been devoted to the study of conscious and unconscious reactions' influence on the facial expressions of people demonstrating aggressive and depressive behavior. Some medical technologies, such as the analysis of heart rate variability, are quite advanced in the study of unconscious or physiological processes (Berntson et al., 1997; Baevsky & Chernikova, 2017; Ernst, 2017; Grippo, 2017), but they do not take into account a person's conscious response, which limits their use to medical tasks only.

Thus, the main task, which has not been solved at the modern level of research of conscious and unconscious processes, is the development of a methodology that allows for the joint analysis of these processes and concentrates the processes of consciousness and unconscious reactions together into personality diagnostics or a psychophysiological state.

Closest to our view of the existing problem is the classic work of Wiener (1948) and the works of Bernstein (1967), which laid the foundations of modern cybernetics and biomechanics. The cybernetic approach to man as a physical object leaves no room for abstract assessments and definitions. In our understanding, the conscious

response of a person is understood in the form of conscious decisions, for example, in the form of verbal or non-verbal responses to presented stimuli. In our opinion, an unconscious reaction is characterized by a change in a person's physiological parameters, but for a correct assessment of the unconscious reaction, the integral physiological characteristics should be measured, rather than the local characteristics associated with the work of individual physiological systems. This approach to a person as an object of study is used in psychophysiological lie detection (Baur, 2006), where researchers analyze the signals of individual physiological systems, and the result is obtained by processing different physiological signals together. However, local time signals of a limited number of sensors used in traditional psychophysiological lie detection cannot provide an extensive aggregated picture of the changes in a person's psychophysiological state, which is provided by the matrix principle of obtaining information by means of vibraimage technology (Minkin, 2017).

II. Methodology for determining conscious and unconscious responses

Experimental data processing was done by the VibraMI program (Vibra MI, 2018). Using organizational, empirical, and statistical methods we studied 574 people ranging in age from 14 to 55 years. The average age of the test subjects was 24.3 years. The study included 142 secondary school students, 40 students in vocational school, 281 college students, 111 people who have completed secondary, vocational, or higher education, 7 of which have an advanced degree. The subjects' fields range from the humanities (musicians, philologists, linguists, journalists) to classical technical specialties (accountants, economists, programmers, engineers). 534 of the subjects were law-abiding citizens who had never faced criminal prosecution, and 40 had faced prosecution. The ethnic composition of the subjects is as follows: 70% European Russian; 25% Caucasian Russian; 5% citizens of foreign countries.

The results of psychophysiological testing are analyzed using the data obtained by the VibraMI program (Vibra MI, 2018) to determine the multiple intelligence profile. The sequence of presented questions is linearly oppositional, where 24 questions are grouped in pairs and each pair of opposing questions refers to a specific type of multiple intelligence (Minkin & Nikolaenko, 2017). The linearity of the questionnaire is determined by the linear increase in the level of extroversion inherent in each type of intelligence, whereas opposition is observed in the presentation of opposite questions in a pair, aimed at determining a person's response to each type of intelligence. Another principle of oppositional use of the questionnaire is the symmetrical arrangement of opposite types of multiple intelligences relative to the center of the questionnaire. In fact, the first four types of intelligence — intrapersonal, philosophical, logical-mathematical, and business — are the opposite manifestations of the interpersonal, creative, verbal-linguistic and ascetic types of MI respectively. Thus, the questionnaire in use has a double opposition structure, within each type of intellect and between opposite types of MI. In addition, it should be kept in mind that of the proposed 12 types of MI, only eight are independent, since the first four and last four types of MI are the opposite manifestations of the same human characteristics. However, since psychology has historically used opposing characteristics as conditionally independent, we will not break with the established tradition.

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2.1 Structure of line-opposite questionnaire

In psychophysiology, it is known that the final psychophysiological response (PPR) of the subject depends not only on the presented stimulus, but also on the sequence of stimuli presentation (Baur, 2006).

We will examine the conditional scheme of stimuli presentation in the VibraMI program, including the sequential presentation of three questions and stimuli (images), given in Figure 2. The Q_i parameter shows the amount of time that the question was presented, and the T_i parameter shows the amount of time that the stimulus-image was presented, which enhances and explains the question asked. R_i shows the subject's response time to the question asked, which can be significantly less than the Q_i interval (as in the case of R_i-1), approximately equal to Q_i (as in the case of R_i), or even exceed the time of Qi, depending on a testee's speed of response to a question.

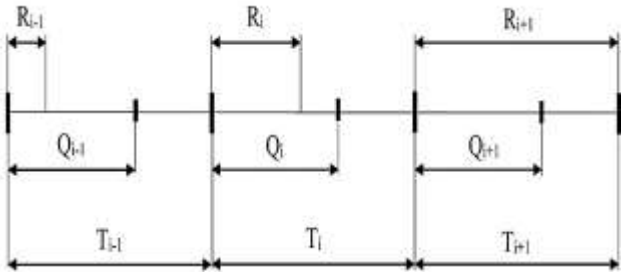

Figure 2. Diagram of questions and stimuli presentation

In the VibraMI program, it is proposed that the questions and stimuli presented are conditionally divided into control and relevant stimuli, analogous to classic lie detection. Even-numbered questions are relevant and are expected to be answered with NO by subjects who have developed a type of intelligence corresponding to the presented stimulus. Odd questions are control questions, and are expected to be answered with YES by subjects who have developed a type of intelligence corresponding to the presented stimulus. The determination of the PPR occurs during the entire test, and it is assumed that the PPR corresponding to the presented stimulus begins from the moment the question and image of the stimulus on the monitor screen appear. A few seconds (depending on the length of the text) are necessary for the subject to read the question, then seven seconds are given for a conscious answer in the Yes/No format, then the text of the question disappears, but the unconscious response to the presented stimulus is still being measured. If an answer of Yes or No is not received, then this is considered to mean that the subject cannot decide on an answer. After the text of the question disappears, there is five second pause in order to minimize the effect of the change in the PPS from the previous question to the next one. After this pause, an image of the next stimulus appears on the screen and the analysis of the psychophysiological response to the next question begins.

The choice of optimal time intervals during testing is a rather important characteristic that can significantly impact the results.

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2.2 Information and energy characteristics of a psychophysiological state

The VibraMI program builds the dependencies obtained during testing, which are individual for each subject. Figure 3 shows an example of the dependence of changes in a subject's information and energy parameters in scales reflecting the information efficiency (%) and the energy consumption.

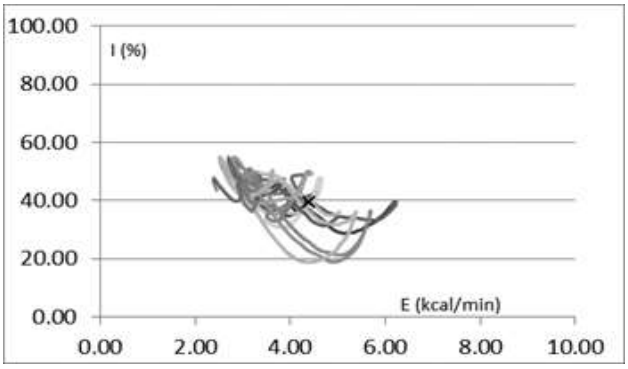

Figure 3. Changes in information and energy characteristics in the scales of information efficiency (I) and energy consumption (E)

The point corresponding to the initial psychophysiological state before the survey is marked by a cross. In spite of the seemingly chaotic nature of the PPS changes during the MI testing, we can determine the general patterns common for the changes in the information and energy parameters. For this purpose, need to calculate the correlation coefficient between the information and energy parameters.

Figure 4 shows an example of the time dependence of the subject's information and energy parameters.

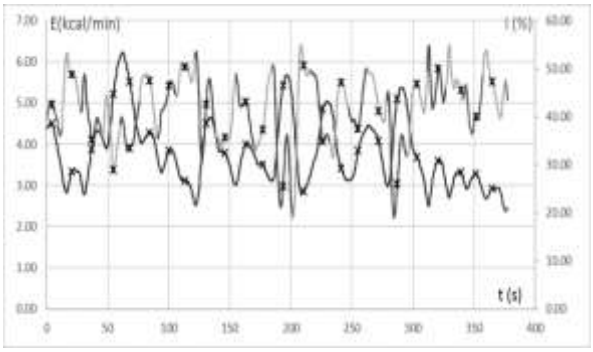

Figure 4. Time dependence of changes in information and energy characteristics in the process of testing MI

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The crosses in Figure 4 indicate the time of the next stimulus presentation in a sequential line-opposite questionnaire. From Figure 4 it follows that the time for presenting a new question most often does not coincide with the moment of changing the direction of each characteristic studied, meaning that there is a certain psychophysiological time lag that exists for both the information and energy components.

2.3 The time dependence of the change in psychophysiological components

In Minkin's work (2018), it was suggested that the information and energy components of a person's psychophysiological state are interconnected and determine a person's overall psychophysiological state. Shannon's work (1948), a classic approach to information laid the foundations of modern information theory and does not link information with other physical quantities.

A typical time dependence of the unconscious, or in our understanding of the psychophysiological response of a subject when testing MI, is shown in Figure 5.

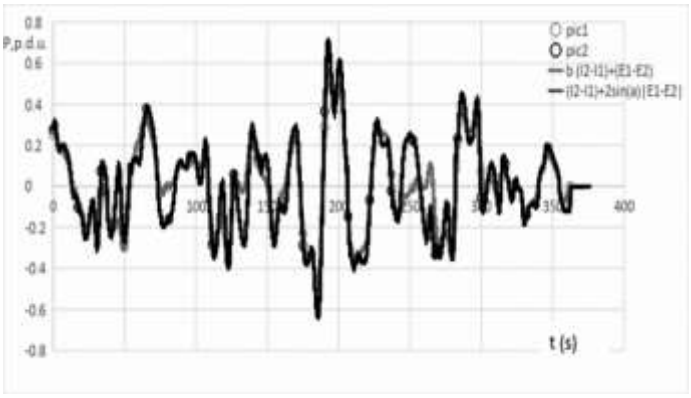

Figure 5. An example of the time dependence of a subject's current psychophysiological response

In the time dependence of the psychophysiological response the points of presentation of the next stimulus are indicated by dots. From this dependence, it follows that the shift in the direction of change of the PPR does not always coincide with the moment of stimuli change.

III. The results of the study of conscious and unconscious responses to the presented stimuli

The VibraMI program used in this work allows one to independently calculate a subject's conscious and unconscious reaction to the stimulus presented, and then builds an MI profile depending on the data obtained on a given subject's conscious and unconscious responses. A subject's unconscious or psychophysiological response to the presented stimuli is determined by vibraimage technology (Minkin, 2017; Minkin & Nikolaenko, 2008) based on

the two main characteristics of information and energy (Minkin, 2018). It should be noted that the analysis of the subject's unconscious reaction gives the researcher a much greater scope for analyzing the results, since the subject's unconscious reaction is determined by the time dependencies obtained, as shown in Figures 4 and 5.

3.1 Unconscious (psychophysiological) responses to successive questions. Determining the optimal algorithm that characterizes an unconscious response

The approximately equal number of results with a weak and strong reaction with different likelihoods of a change in direction allows for the following conclusion. With a weak PPR, the change in the direction of the PPR is close to 50%, i.e. it is about equally likely for PPR to move in one direction as in the other direction when the value of the PPR is near the center of mass. However, the probability of a change in the direction of a PPR exceeds 90% in the presence of a strong PPR, as shown in Figure 6.

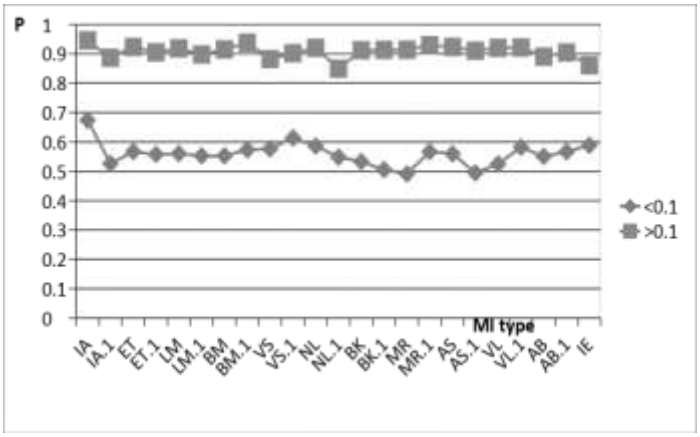

Figure 6. The probability of a change in the direction of the PPR depending on its magnitude (the proportion of subjects who have a change in response direction)

Thus, it is shown that after a strong response to opposite stimuli, the next stimulus or question, although it is not oppositional in essence, has a high probability of being perceived by the subject as oppositional. In this case, an arbitrary alteration in the direction of change in the PPR is quite likely if the question is not significant for the subject. So the probability of changing the direction of the PPR is close to 50% when the subject has a weak psychophysiological response to a given question.

An important property of the information and energy characteristics is the presence of a one-sided (opposite) trend in the indicated time dependencies. In order to correctly calculate the maximum of the frequency spectrum by the Fourier method, the linear trend is removed (Bendat & Piersol, 1986), however, at the same time, the maximum expression of the low-frequency components is preserved. Thus, the combination of information and energy characteristics gives the most complete picture of the period of change in unconscious responses.

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The presence of an oppositely directed trend in informational and energy characteristics seems to be quite important, since it confirms the assumptions made that during psychophysiological studies, time should be minimized in order to eliminate errors due to changes in the test subject's PPS at the beginning and end of testing. The time dependencies of the information and energy components show in Figure 7 confirm the existing divergent trend averaged for all subjects.

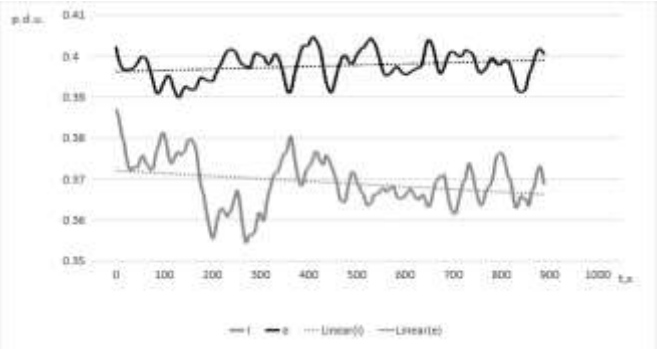


Figure 7. Time dependence of the averaged values of the information and energy components during testing time

The time dependencies in Figure 7 show that a subject's psychophysiological state is constantly changing during testing, and with an increase in testing time there is a noticeable increase in energy consumption and a decrease in information efficiency.

3.2 Development of criteria and determination of norms for a subject's conscious and unconscious responses during line-opposite questionnaires

3.2.1 Conscious response

The experiment conducted with the correction of certain stimuli showed that the mathematical apparatus, namely the correlation matrix, can be used to identify and correct stimuli that are inappropriate for the proposed concept.

3.2.2 Unconscious response

Lower value of the inverse correlation between neighboring and especially opposite stimuli indicates less opposition between the presented stimuli. In addition, the data given in Table 1 allows to select the optimal algorithm for calculating the PPS, namely, determining the PPS between the minimum and maximum values during the presentation of the stimulus. It is this algorithm for calculating the unconscious reaction that was introduced into the VibraMI program after this present research was completed (Vibra MI, 2018).

Table 1

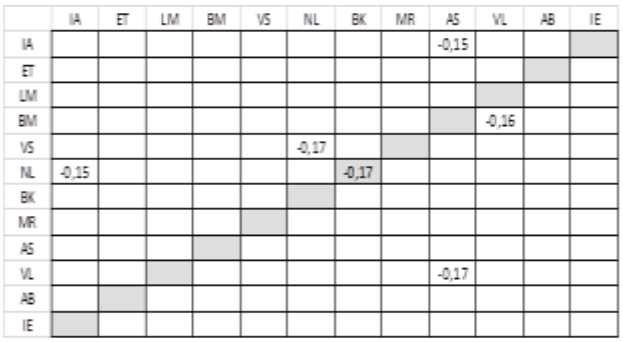
Corrected questions for philosophical and creative types of MI for 62 subjects

Question №	Question text
3	Lying on the couch and thinking is more important than bustling around.
4	I can create something new and unusual
21	You must act in order achieve the desired result
22	I like to philosophize and dream about everything

IV. Discussion of the results

The study of conscious and unconscious responses allows us to make a number of interesting and practical suppositions that are not obvious at first glance. The results show that in each individual case, the conscious and unconscious reactions may or may not coincide, or, more accurately, have different meanings. At the same time, a unified approach to processing the results of conscious and unconscious responses proved that the obtained results for conscious and unconscious responses can and should be added and it is the sum of the reduced conscious and unconscious responses that determines the positive or negative significance of the presented stimulus for a particular person.

It should be noted that the proven lack of correlation between a person's conscious and unconscious response to a stimulus is direct evidence of the ability to conscientiously process (add or average) these reactions, which is the basis for obtaining the MI profile (Minkin & Nikolaenko, 2017). Of course, the main factor for obtaining statistically correct test results is not the label of the intelligence types, but the correctly selected questions and stimuli (images); one could simply change the stimuli without changing the names of MI types. The correlation matrix between conscious and unconscious responses is given on Figure 8.



	IA	ET	LM	BM	VS	NL	BK	MR	AS	VL	AB	IE
IA									-0,15			
ET												
LM												
BM										-0,16		
VS						-0,17						
NL	-0,15						-0,17					
BK												
MR												
AS												
VL									-0,17			
AB												
IE												

Figure 8. Correlation matrix between the conscious (horizontal row) and unconscious responses (vertical column) obtained from the results of 167 MI tests

Various diagonals (let's call them stepwise — the diagonal between neighboring questions and the main one — the diagonal between centrally symmetric questions relating to opposite types of intelligences), obtained in the correlation matrices of conscious and unconscious responses, allow us to make an assumption about the different temporal natures of these responses.

Conscious attitudes have a pronounced remote character in time. It turns out that in reply to test questions presented in the immediate time proximity (in a row), subjects are less likely to give opposite conscious answers than to almost the same opposite questions (stimuli) distributed over time. Conscious responses practically do not work on stimuli that are close in time; such an explanation is obvious due to the absence of negative correlation in the stepwise diagonal of conscious reaction between adjacent questions. The unconscious response has the opposite nature with respect to the conscious responses. Unconscious response has a negative correlation only for nearby stimuli and has practically no negative correlation for the same, but spaced out questions. This multi-temporal defense system allows a person to more adequately respond to emerging stimuli and is more evolutionarily stable than any other adaptation option. In addition, conscious and unconscious responses vary in the type of stimulus presented. The human conscious response is manifested in responses to stimuli that are close in meaning, and unconscious to opposing stimuli. Such an approach is likely the most progressive for evolutionary development, since when making a final decision a person can focus on a comprehensive analysis, and nature, in the form of conscious and unconscious responses, offers one the maximum information to make the right decision.

We assume that in addition to our scientific and theoretical results, the present article allows for practical conclusions to be drawn as well, for example when conducting interviews or lie detection. It is well known that the most common method of psychophysiological detection of deception is the comparative testing model, which includes the multiple presentation of three questions of the I-C-R structure (Backster, 1963; Baur, 2006), which includes irrelevant (neutral), control, and relevant questions. In this case, a comparison of the psychophysiological response is carried out between the control and the relevant questions. The results show that the most common presentation should be inferior in effectiveness to the questionnaire consisting of the I-C-I-R structure (irrelevant-control-irrelevant-relevant), since it was shown that after a significant response to the control question, a significant

response to the subsequent question is close to 90% regardless of its significance for the subject. However, the psychophysiological response after an irrelevant question more adequately reflects the true significance of the question presented to the subject. It should be emphasized that the presentation of several relevant questions in a row, also recommended during interviews (I-R-R-R) (Baur, 2006), should be even less effective than the presentation of the ICR format questionnaire, since the natural psychophysiological regulation virtually eliminates the natural psychophysiological response to the second and third relevant questions.

The statistical dependences of the conscious and unconscious response to opposing stimuli show a high degree of determinism and the manifestation of conditioned reflexes (Pavlov, 1927; Sechenov, 1965) in human behavior. Of course, even in the example shown in Figure 5 of the time dependence of the subject's current psychophysiological reaction to the LOQ, it can be seen that, depending on the importance of the stimuli, the direction of the PPR changes with different delays from the moment the stimulus is presented. That being said, the general patterns of changes in PPS practically confirm the conclusions made by Pavlov (Pavlov, 1927) about the high significance and individuality of acquired conditioned reflexes.

We believe that in this article a quantitative analysis of the integral psychophysiological regulation functioning is given for the first time. Previously, researchers have limited themselves to analyzing the regulation of individual physiological systems (Wiener, 1948), for example, cardiovascular (Baevsky & Chernikova, 2017) or vestibular (Bernstein, 1967).

Of particular interest is the identified tuning of the human body to a given rhythm upon presentation of opposing questions. In our opinion, the periodic changes shown in the psychophysiological state can provide additional information for the study of new and already known chronobiological processes (Halberg, 1987; Reddy et al., 1984), including the use of vibraimage technology for the study of chronobiological processes. Most of the known works aimed at studying chronobiological processes analyze the time dependences of biological parameters on external natural factors (Halberg, 1987; Reddy et al., 1984) or on the internal resources of the body (Baevsky & Chernikova, 2017; Fleishman et al., 2014). Indeed, chronobiology is an important tool of new biology. Rhythmic studies in and around us provide basis for a broader transdisciplinary science which includes all branches of medicine, chemistry, biology, physics, sociology (Dar & Rather, 2019), and in particular psychology.

In our opinion, the possibility of imposing a controlled external rhythm of changing physiological parameters can be of independent value for applications in medicine, psychology, and psychophysiological testing. There is a method of imposing a physiological rhythm that relatively close to the one proposed and used in medicine and electroencephalography. To identify various diseases, intermittent photic stimulation is used, which consists in illuminating the human head with short light pulses (stimuli) with a certain frequency (Kasteleijn-Nolst Trenité et al., 1999; Kasteleijn-Nolst Trenité et al., 2012). The frequency of photic stimulation is shown in electroencephalographic signals reflecting brain activity. The method of photic stimulation can be used to implement a conditionally telepathic connection between people (Jiang et al., 2019). Thus, the method of intermittent photic stimulation allows for a certain rhythm to be imposed on a local physiological parameter, but it is not comparable in complexity to the processes occurring in a person upon presentation of an LOQ and does not include the entire

aggregate and interconnectedness of conscious and unconscious responses. The process of presenting complex stimuli causes a conscious and unconscious response, including influencing the functioning of almost all physiological systems of the human body and the interaction of these physiological systems determines the periodic change in a person's psychophysiological state.

The rejection of the subjective habitual qualitative terms characterizing a person's state (for example, aggressive, happy, depressed, stressed, etc.), the transition to measuring physical quantities and the cybernetic approach to a person as a physical object will make psychology an accurate and modern science using psychometrics. Such an approach will allow us to bring humanity to a new stage of evolution and understanding of its place in physical nature.

V. Conclusions

Studies have shown the feasibility of using the periodic presentation of opposite stimuli to control a person's psychophysiological state. The results show a high degree of adaptive regulation of the integral characteristics of a person's psychophysiological state and its effort to maintain the psychophysiological balance through the work of consciousness and physiological systems. It was found that the conscious and unconscious responses complement each other and do not correlate with each other.

Using spectral analysis, it was shown that the information and energy characteristics, taken separately, do not provide a predetermined periodicity in the change of the unconscious reaction corresponding to the period of questioning. This result confirms the need to integrate these two indicators for the most complete picture of the periodic nature of PPS changes in the testing process.

The high efficiency of the vibraimage technology demonstrates that it is a psychometrics technology with the widest use, including determining the quantitative evaluation (measurement) of the conscious and unconscious human response. The possibility of determining the optimal parameters of psychophysiological testing using the methods of mathematical statistics has been proved. The revealed dependences of psychophysiological regulation make it possible to review practical methods for conducting interviews, surveys, and lie detection, and to more efficiently choose incentives and a sequence of stimuli for profiling.

The human cybernetic model used (Minkin, 2018; Wiener, 1948) and the information-energy approach to determining conscious and unconscious responses as well as measurement of psychophysiological state proved their practical feasibility, accuracy, and effectiveness.

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