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AWARENESS AS A RESULT OF CHOICE*

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The article describes various studies on awareness - unawareness processes conducted at the department of General psychology at St.-Petersburg State University, Russia. The topic under discussion is the aftereffect of the *negative choice,* which was discovered by the author. This phenomenon is related to some other well-known psychological phenomena. The article discusses the meaning of this phenomenon (the aftereffect of the *negative choice)* for the research program in the psychology of consciousness.

Negative Choice Consequence in Memory Studies

In early 1970s while investigating memory process I have found out a striking paradoxical result of a simple experiment. The main design of experiment was the following: the subject was presented with a sequence of symbols of the same kind, not associated with each other, which were 1,5-2 times longer than possible for retrieval, i.e. 1,5-2 more than the short-term memory span. Different sets of stimuli were presented several times. After the set was presented and recalled, the next set included some new stimuli not presented in the previous set and some old elements distributed through the set in the following manner: 1-2 old elements that were recalled from the old set and 1-2 elements that the subject forgot (were not recalled). Old elements usually appeared in the same position as in the previous set. As it was expected, all the elements recalled in the first set were retrieved better in all the consequent sets. The same was expected to happen with elements that were forgotten (not recalled) the first time: these elements were expected to be recalled slightly better. Surprisingly, the opposite effect was observed once an element was not recalled it was more likely not to be recalled in the following sets.

Accordingly, during an experiment with the set of two-digit number, the probability of retrieving an old, once missed elements was 12 % lower than the probability of retrieving a completely new one. This effect not to retrieve once forgotten material was consequently verified on different stimuli; sets

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of consonants, pairs "letter - number", sets of nonsense syllables, names of playing cards, sets of buttons, sets of toys, etc. This effect can be detected in cases when subjects correctly recall 50-80 % of the stimulus sets. One experiment with the unusual stimuli set was conducted as well. Musicians with absolute pitch had a task to retrieve inharmonious chords that contained 6 sounds. The probability of retrieving sounds, missed in the previous chord was less than the probability of retrieving a new one, i.e. not presented earlier. When naming sounds the difference in retrieving was 12 %, it increased up to 18 % (of not retrieving) when playing the piano (p=0,01). The result held irrespectively of the place of the sound position in the chord, though in the middle positions, where sounds (stimuli) are generally recalled less, this tendency lessened slightly.

The only experiment that did not bear the same result was with word retrieval. Apparently, the same word forms different nets of associations with different sets of words around them. Since the word can change its meaning within a different set and thus, it (word) might become a new stimulus. According to some data (that should be verified further) the tendency to not-recall the earlier non-recalled becomes lower when the person is fatigued or under the alcoholic influence.

These results were truly astonishing. In order to repeat the same mistake (once forgotten B-flat note or number "47") you have to memorize this element (the note or the number "47") as marked "not to retrieve". In general, we can suppose that for the consistent forgetting of the stimulus, we need first to identify it, and then to remember that this stimulus should not be retrieved. So the omission in retrieval is the negative retrieval, but not the absence of retrieval. Nevertheless, it seems to be very strange: if the subject remembers missed elements, then why s/he does not recall them? Such a phenomenon needed an explanation.

Therefore, the H. Ebbinghaus findings can be explained differently. The learning curve created by H. Ebbinghaus shows that the number of repetitions of the stimulus set necessary for memorization of the set increases faster than the number of elements memorized (see Rohracher, 1963 for a detailed discussion). H. Ebbinghaus could remember 6-7 nonsense syllables on the first trial, but in order to remember 12 syllables he needed 14-16 trials. Explanation of this fact faces difficulties; however, it is much easier explained if we consider current findings.

Imagine that the subject is memorizing N elements not associated with each other (digits, nonsense syllables, etc.). Let us state then that s/he retrieves only P-elements in an i-trial correct - that will be pi elements, and the non-recalled elements we will call q_i elements. Thus, the formula should be:

$$(1)\ N = p_i + q_i$$

Which information is retained in memory of the subject? If it is only p-elements that are remembered, then the subject should perceive Q elements (presented i times) in the (i+1) trial as completely new. Needless to say, it is not so. Because if it is so no learning as a sequence of connected actions can exist. Everyone would notice changes in a set to be learned even if only the non-retrieved elements were to be changed. Therefore, not only p-elements, but also some q-elements are remembered. However, in each subsequent trials only p-elements are retrieved, and q-elements are not-retrieved. So for H. Ebbinghaus, in order to memorize 6 non-retrieved ("forgotten") elements from the first trial 15 extra presentations were needed. This can be phrased as follows: "forgotten" elements in the first trial have a tendency not to be retrieved in succeeding trials. Thus q-elements are the special elements which are stored in memory but are not retrieved and stay unconscious.

To some extent the discussed phenomenon reminded us of the process of suppression, described by S. Freud. Suppression has its own reasons, investigated by psychoanalysis, but at the same time it presumes the existence of the censorship mechanism that decides what information should stay unconscious. As it is well-known in psychoanalysis, information once suppressed would not penetrate to consciousness. Our experiments proved the fact that the cognitive process of suppression really exists but it has nothing to do with S. Freud's theory. In the spirit of psychoanalysis these data could be explained in the following manner: for some reason a musician does not like to hear the B-flat note due to some unconscious influences, which leads to the suppression of the sound without any awareness, which leads, then, to recurring mistakes in retrieval of this sound. Yet, we are unlikely to find any musician who would prefer not to hear a certain sound or not to use any keynote. But above all, such an explanation does not match the results of the studies. The truth is that every missed (forgotten, not retrieved sound) has the other aftereffect: it is more likely to be recalled in the trial it has not been presented, and thus, it does not have to be retrieved. So, imagine that B-flat was presented in trial 2, and it was not retrieved, then it was **not** presented in trial 3 and **was** recalled. We would regard this retrieval of non-presented element as an error. Musicians in our experiment recalled 15—20 % of sounds presented in the previous trial in error. At the same time the percentage of retrievals of the sounds that were missed though presented in the previous set was significantly higher (23-34 %). When a once missed stimulus starts to be erroneously retrieved, it turns out to be a very strange display of the suppression mechanism.

Psychoanalytical theory assumes awareness of the suppressed information, but in the other form.

To summarize all the above we can postulate 2 aftereffects: if once missed (forgotten) stimulus appears in the succeeding set, it tends not to be retrieved, and visa versa if it is not presented in the succeeding set, it is erroneously recalled.

To explain these extraordinary data we can presume that the awareness is a result of the work of a special cognitive mechanism that decides what it is to be aware of (positive choice) and what it is not to be aware of (negative choice). Our data show that this mechanism has a tendency to repeat its choices. Once the choice has been made to be aware of something it remains in consciousness, but what has been chosen to be forgotten, stays in the unconscious. Nevertheless, when the environment is changed, once "forgotten" information can suddenly appear on the conscious level. Our research (Воскресенская, 2006) showed that generation effect (i.e. it is easier for subjects to remember the material generated themselves then merely presented to them) is a result of the aftereffect of both negative and positive choices simultaneously. Yet, the aftereffect of the negative choice has to be shown in cognitive tasks outside just the memory tasks domain. The independent evidence is needed to show that the special mechanism which makes a decision about awareness exists.

Negative and Positive Choice Consequences in Perception and Sensory Tasks

Similar assumption of the existence of a special mechanism of determining the figure/background relation is described by Gestalt psychology. In the classic study by E. Rubin (see discussion in Bouman, 1968) the existence of the figural aftereffect is confirmed. In our terms it is the aftereffect of the positive choice. E. Rubin presented nonsense black-and-white pictures that could be perceived either a black figure on the white background or vise versa. E. Rubin verified that the figure that the subject perceived in the training trial is the one the subject would perceive during the test stage a few days later without acknowledging the recognition of the test material. Gestalt psychologists did not think that their data can be interpreted any other way. However, when a subject chooses black parts of the picture as a figure s/he will choose the white parts as the background at the same time. Consequently, we can interpret results of E. Rubin's experiments according to the negative choice aftereffect: things that were chosen as a background tend to be perceived as background during the

succeeding presentations. Thus, if the background aftereffect exists, then it is the negative choice aftereffect.

By the way, many Gestalt psychologists emphasize the following fact: when subjects are presented with ambiguous pictures, once one interpretation has been realized, the other one is very difficult to get at. Usually neither pointing it out, nor naming, of the second image does not help subjects to see it. It is the result of the negative choice aftereffect, is not it? Furthermore, a number of studies show that even though the subjects somehow perceive the second interpretation, they are still completely unaware of its presence, In Rubin's experiments we can observe both effects: the aftereffect of the figure and the aftereffect of the background.

In our current research (Филиппова, 2006) while observing the ambiguous pictures (the realized interpretation was controlled) the subjects accomplished a number of cognitive tasks connected or non-connected semantically with the possible interpretations of the picture (for instance, anagrams deciphering, identification of masked images, etc.). It turned out that the figural aftereffect impacts these tasks greatly: tasks connected with the realized interpretation of the picture were solved quicker than the tasks not connected to this interpretation. At the same time tasks connected with the other non-realized interpretation of the picture were performed slower than the tasks non-related to the either of interpretations. This result directly shows the aftereffect of unconscious interpretation of the picture.

Many researchers observed that errors in recognition tasks are more time consuming than the correct responses. To our surprise this happens both when the subject is confident of the answers as well as when s/he cannot clearly distinguish between the correct and incorrect responses. We believe that this is related to the negative choice aftereffect phenomenon. In order to make a mistake in recognition, it is necessary to make a special decision not to perceive the received information, but to realize the completely different information. The negative choice aftereffect can exhibit itself in the delay of becoming aware of the previously unconscious information. Our research shows the possibility of negative choice aftereffect in the process of detection of homogenous stimuli.

The task of the experiment was to detect the value indicated by the arrow-pointer with the exposure time of 300 ms, and the average error probability was 0,29. At the same time the probability of a recurring error in the next exposure for the same value was significantly greater - at 0,43. On average the response time of the correct answer was less than the incorrect ones. As it turned out the frequency of responses plays the most significant role. If answers on the value presented were all the same and contained an error,

then response time was less than the time of the correct response. In fact, when the answer to the value presented was unique, then it was correct and the response time was 1,15 sec. If the there were 2-3 answers for the same value exposure the reaction time increased to 1,28 sec. When there were 3 or more options of answers the reaction time increased to 1,45 sec. So, when a number of homogenous stimuli are exposed for a short period of time then the response time depends on the variability of errors made by the subject (see discussion in Аллахвердов, 1993).

In our opinion, many phenomena of perception cannot be understood without the idea of the aftereffect of the negative and positive choices discussed here. M. Kuvaldina (Кувалдина, 2008) noticed the similarity between change blindness effect and the negative choice aftereffect. In visual perception, change blindness is the phenomenon where a person viewing a sequence of pictures fails to detect significant changes in the scene. In experiments of R. Rensink the "flicker" technique is used: two images of scenes alternate repeatedly with a brief (80 millisecond) blank screen after each image, giving the display a flickering appearance (Rensink, 1997, 2002). Such design of experiment shows that it can become very difficult to see a change that is obvious once attended. There are lots of theories (see review in Simons, 2000) of the effect trying to explain inability (may be even physiological) of our attention to realize the differences on the pictures. Though some experimental data show us that nevertheless subjects can report about changes been induced (Simons, 2000). Tendency not to realize stimuli changes seems to be the same negative choice aftereffect. If once the difference between pictures was not realized then it would continue to remain unconscious for a certain time because of the special decision been made.

It is still a serious problem for psychophysics to explain the possibility the subliminal perception. To make both ends meet some of the authors even offer the idea of the sensory thresholds multitude (Merikle, Smilek, Eastwood 2001; Overgaard et al., 2006). The work of consciousness in the task of signal recognition usually is not highlighted in the psychophysics concepts. In our research we demonstrate, that consciousness plays the key role in the shaping of the sensory thresholds: merely *illusory* increase of the stimuli leads to the increase of the sensory thresholds, though the physical size of the stimuli does not change at all. The aftereffect allows us to discover signal recognition even in those cases, when the subject itself does not recognize them consciously.

In the research of N. Vladykina (Карпинская, Владыкина, 2008) the sounds of different intensity (as well as the horizontal segments of different lengths) were presented to the subjects. The subjects could not discriminate

between stimuli within the zone of presentation. One signal in the pair of sounds of the same frequency (1000 Hz) (the sample) was always constant (70 dB). The volume of the other sound varied relative to the sample volume: 0; ±0,25; ±0,5; ±0,75; ±1; ±1,5; ±2; ±3; ±4; ±5. Each of the variants was presented 10 times. The duration of the each of the signals was 0,1 sec. The interval between the sounds in a pair was 1 sec. The subject's task was to compare these signals with the sample and to answer: louder, lower or equal. The subject was to press the required key on the keyboard to choose of the answer. The time between the subject's answer and the beginning of the next pair exposure was 2 sec.

The position of the sample sound in the pair (it was presented as the first or the second sound) and the difference between the sample sound and the compared sound varied by chance. 18 persons participated in the experiment. The range of ±1,5 dB was taken as the interval where all of the subjects could not discriminate between stimuli. Beyond the limits of this interval almost all of the subjects showed strong increase in the percentage of the correct responses and the decrease of reaction time. Some subjects had larger than ±1,5 dB interval, but nobody had narrower one. Thus, in this area of absence of differentiation the significant aftereffect of the positive choice was discovered.

So, if the subjects gave the correct answer ("louder" or "lower"), the repetition of the correct answer in the next presentation of the same signal occurred three times more frequently than the change of the answer. It means that the subject not only distinguishes the correct answers from the incorrect ones in some way (though we assume that all the stimulus pairs are perceived by the subjects as absolutely equal), but also remembers his/her previous answer for the stimulus pair presented. It seems valid to speak about making of a special decision about being aware/unaware of something.

The Aftereffect of the Negative and Positive Choices in Solving Other Cognitive Tasks

When we were in school and learned how to add numbers "in a column", our wise mathematicians said: "There may be some mistakes in our addition, so we should check our result". But they also said that we should check our answers *in another way*, not in the way that we added in a previous time. So, if we added numbers in a top-down manner, when we want to check our answers we should add numbers in a bottom-up manner. But why should we? Our experienced teachers answered, that we should do so, because if we did it in the same way we would make the same mistakes. This striking

argument exactly describes the consequence of the negative choice phenomenon! The pupil adds "2" and "3" and gets "6" for some reason. He does not realize that he has done a mistake. This result does not agree with his formed automatisms. But nevertheless he repeats this mistake during the repeated adding. But to repeat the mistake one should remember (maybe in some unconscious way) what kind of mistake was made and where it was. Or how one could repeat it otherwise?

A. Agafonov (Агафонов, 2006) demonstrates how the aftereffect of the negative choice shows itself in solving arithmetical tasks in the state of hypnotic prohibition. The experimenter gave the subject being in hypnotic sleep such an instruction: "Now you should solve the arithmetical sums as quickly as possible. You can solve quickly and precisely. But you will not see the number "11". You do not know the number "11". After this instruction the subjects were to solve 10 sums in a written form (e.g. "69 + 34" or "88 - 57"). Five of them had the number "11" as the answer (e.g. "5 + 6", "93 - 82" and so on). The subjects wrote their answers themselves. Then they had to read what they wrote. The subject who solved all the sums correctly could not nevertheless see and read the prohibited number. The other subject wrote the number "13" everywhere instead of "11". But all of the sums were different. So, to repeat the mistake, which was made once, in the next sums where the answer consisted of the prohibited number, this number had to be first calculated and only then changed.

In O. Naumenko's study (Науменко, 2006), 40 identical arithmetical sums with 2 versions of answers were presented to the subjects. The instruction for the subject was: to choose the right variant of the answers without any calculating. The sums were rather difficult (e.g. to choose, which of the variants - 47 or 57 - answers the third root of 103823). The subjects gave the answers quickly and, in fact, by guess. In a week the same sums (but their sequence was changed) were presented to the subjects, and one more wrong answer was added to the variants. As it was expected the number of the right answers chosen did not differ from the chance one (in the first series - 50 % of the right guesses, in the second one - about 30 %). But in the second series there appeared the statistically significant tendency to repeat the choice of the right answer, i.e. the considerable aftereffect of the positive choice. The identical result was found for the task of passing labyrinths. In my research (Аллахвердов, 1993) the subjects (without any skill to do it) converted the list of the accidental dates of the 20-th century to the days of the week. In general they did it a little worse that by chance. There was the considerable tendency not only to repeat the right answer in the next trial (22 % cases when the probability of guessing by chance was 14,3 %), but

also the tendency to repeat the same deviation from the right answer in the next trial (i.e. if the presented date corresponded "Wednesday", and the subject said "Saturday". When the next date corresponded, for example, "Monday", the subject said "Thursday" significantly more often than by chance).

The tendency to repeat the previous deviation was found in the tasks of psychomotor learning. One of my research (Аллахвердов, 1993) demonstrated that the probability of making the repeated mistake in the same word during the type-learning is 6 times more than the merely probability to make a mistake. The case in point is the misprints, but not the misspelled words. (Although, the existence of the recurring misspellings of the competent people itself demonstrates the aftereffect of the negative choice).

In N. Ivanova's research (Иванова, 2006), a simple computer game was produced: the subjects were to let fly at the target moving across the screen (the red circle sized 40 pixels). The accuracy of the shoot was registered. The experiment consisted of the series (each of 200 trials). The subject was to perform 15 series and make 3000 hits. The learning effect was revealed apparently. But the aftereffect of the negative choice was also evidently found: the subjects repeated their answers in the two trials in a row accurate within the pixel (the result was statistically more frequent than the chance-level). The aftereffect of the positive choice was also found: the probability of repeating the accurate shoot in the target was two times more than the probability of the accurate shooting the target after the miss. In other words, the accuracy of repeating mistakes even in the beginning of the learning exceeded not only the accuracy at the end of the learning process, but also the possibility of conscious distinguishing. The increase of the repeated mistakes was also observed, i.e. the more accurate subject's work was the more frequent his successive repeated mistakes were.

The tendency to repeat previous mistakes in motor acts have been noticed by many investigators in this or that way. About a century ago K. Dunlap (1928) even offered the method of straggle against the repeated mistakes. But the clear description of the reasons for such mistakes has not been done. The concept of the negative choice aftereffect allows us to describe a very wide range of phenomena in a unified manner.

Particularly, now we can explain the phenomena of incubation and insight in creative act from the single position. The solution that was found will be brought to the conscious level. In case, when the subject was not aware of it, i.e. it was negatively chosen, it would not be brought to the conscious level further due to the aftereffect of the negative choice. If the search for solution is persistent, the tendency not to realize the unconsciously found solution

will be stronger. However, as it was noticed above, the aftereffect of the negative choice has another tendency: when the situation changes, the elements negatively chosen before can suddenly appear at the conscious level in an inappropriate moment.

The change of the situation occurs just in the phase of incubation. The solution which has been negatively chosen before and which has suddenly appeared at the conscious level, is usually accompanied by the emotional raise, typical for the insight. It signals: "the solution has been found, you need to find the problem, which proposes such a solution". This idea is confirmed with the effect of the emotional anticipation of the solution (Тихомиров, 1969). If the solution is known and the problem was recently actualized at the conscious level, it usually becomes found out. The suggested approach to the description of the creative process and the illustrative empirical confirmation are taken up in my other works (Аллахвердов, 2001, 2006).

The Influence of the Weak Changes of the Situation on the Consequences

So subsequently, the change of the situation would lead to a decrease of the repeated mistakes and, thus, to an increase of the effectiveness of the activity. However, it is not easy to define, what kind of changes turns out to be a change of the situation for the subject. For example, will the situation change for the subject if the irrelevant parameters change? As a matter of fact, the introduction of the irrelevant parameters complicates the task for the subjects, so the effectiveness of solving the problems usually decreases. Nevertheless, the increase of the effectiveness is revealed under special conditions. The use of mnemonics is in fact the irrelevant complication of the task, which still improves the memorizing.

In our research we have found, that a regularly variation of the irrelevant characteristics of the stimuli positively impacts memorization. In Y. Ledovaya (Ледовая, 2006) research the subjects memorized 12 five-digit numbers till complete recall was possible. The figures within each of the numbers were divided with two hyphens, e.g. 25-17-3 or 2-517-3. The subjects were to reproduce only numbers without paying attention to hyphens. Four of 12 numbers had the stable combination of hyphens. The other four numbers were presented with two variants of hyphens position done in turn (regular varying). Four numbers left had four variants of "spelling" (hyphens position). The subjects considered this variant of dividing numbers with the hyphens as chaotic. The stimuli with the regular changes are proved to be memorized

significantly better, than the stable or chaotic ones. This effect is revealed more strikingly if we exclude the influence of the position curve. During the retest the regular stimuli were memorized better again. In the other research the subjects were to memorize the location of the colored square in the matrix (there were 12 of matrixes) and the place of the matrix in a row. The reproduction of the color was not required. The matrixes with the regular changing color of the squares were reproduces better, than the matrixes, where all the squares were colored black. V. Gershkovich (Гершкович, 2006) discovered that the material is memorized even better, if the deliberately irrelevant numbers (which are not to be memorized) are presented along with the numbers which are to be memorized.

But not only changes of the irrelevant parameters influences the consequences and the effectiveness of the activity. N. Moroshkina (Морошкина, 2006) asked her subjects to add and subtract digits in turn. Only the pairs of digits were presented (without indication, which arithmetical operation should be done), while adding or subtracting the pairs they resulted with the simple quantity. There were 16 pairs. These pairs constituted the series, which were presented to the subjects one after another. If these 16 pairs were presented in a strictly settled sequence, the learning occurred faster. At that the number of repeated mistakes in the same sums of different series increased. If the pairs in the series were presented in an accidental sequence (the control group), the learning proceeded slower and the mistakes, following one after another in one series, occurred more frequent. When the task of alternation of operations was complicated (to add twice, to subtract three times, then to add twice again and so on) the learning occurred faster than the learning in the control group where the complications were omitted. Thus, the complicating of task by introducing the implicit regularity or the complicating of the operations alternation leads to faster and exact calculations.

General Discussion: On the Way Towards Theoretical Psychology

The scope of this article limits the description of all the ideas leading to the studies described above; here, they are merely listed. I restrict myself to articulate just 3 following ideas, which are partly confirmed by experiments and partly are reflections and logical speculations.

1. Every theory is formulated for ideal objects, which do not exist in reality (for example, a null path, which does not have any width and length). Ideal object does not contain features that the real object does. At the same time the ideal object can have some features that certainly are not the features

of the real object. The method of idealization is a mental reduction of some parameter of the real object. This reduction can be helpful because it discards some accidental details and presents the phenomenon in its integrity (Аллахвердов, Шилков, Кармин, 2007). The ideal object for our theory is ideal mind, which has no limitations placed on storage, encoding and speed of processing information. Ideal mind by assumption automatically extracts all regularities in the stimuli presented and can perfectly regulate our behavior. Hence, we face a problem: if our mind is so powerful, what does it need consciousness for?

The hypothesis about the ideal mind is surely incorrect. It can be useful only to understand the fact that all laws of mental activity, all restrictions applied to the work of consciousness cannot be explained by physiological reasons solely. The positive and negative choice aftereffects justify the validity of this approach. We presume that everything in mental activity should be explained by the logic of cognitive processes but not by the nerves system functioning or biological adaptation goals. Nothing in mental content is done with the aim of "making worse", "forgetting", and "weakening", all the errors under discussion are the essential sequences of normally organized cognitive processes but are not the results of limitations and defects of the nervous system.

It is essential to note that the results of our experiments are very closely related to the cognitive unconscious investigations, a field that is rapidly developing in the last 30 years (for review see Greenwald, 1992; Cleeremans, 2006; Аллахвердов, Воскресенская, Науменко, 2008). However our task was neither to prove the power of cognitive unconsciousness, nor to verify whether it is "smart or dumb" (for example, "American Psychologist" devoted the whole volume to the problem in 1992). The main problem for us is not the cognitive unconscious but the riddle of consciousness.

2. Most of the paradoxes and puzzles arise from the fact that the consciousness is regarded to be a unique structure. Let us take one of the most typical problems that cannot be solved until the complexity of the conscious structure is not admitted. It is usually described in a question: "How can we verify our ideas about the world surrounding us?" Modern history of philosophy starts from various unsuccessful efforts to answer this question. Our consciousness works only with representations of the world but not with the reality itself. We cannot compare things that we are aware of with things that are not in the consciousness. Then how can we distinguish between reality and fantasy? How can we verify, for instance, that we have such traits of character that we believe to have? In order do this is we have to compare our hypothesis about ourselves with ourselves. But this means

to know in advance who we are, which is impossible. How can we confirm this knowledge then? Horrified by such riddles philosophers refused to regard the truth as a correspondence to reality.

The philosophy of science of the XX century encourages us to validate our hypotheses in independent tests. It means that the hypothesis should be confirmed by the means of data and in a way, which differs from the ones this hypothesis was obtained by (in fact, this idea goes back to Immanuel Kant). If we transfer this idea to any hypothesis, which is generated by our mind, it means that all of the hypotheses should be verified independently. So there should be some blocks of cognition A , independent from each other, receiving different information and processing this information in different ways and not sharing the results of this processing with each other. The comparison of the results occurs in a higher block B , which passes only the qualitative signal about the coincidence of the results (e.g. the emotional signal) to the underlying blocks. These specially marked signals are the ones that we are aware of.

However, the comparison of results of the independent cognitive blocks functioning cannot occur immediately (so as the sensory information cannot be immediately compared with the motor one, and the visual one - with the taste one). The block B, c an only guess about the results of the comparison and verify its guesses in the independent tests (i.e. by means of the independent blocks B_i). Thus, the complicated system of cognitive blocks of different level is constructed.

3. To avoid the infinite extension of cognitive blocks we should presume the existence of a certain final cognitive block. We may suggest that this block is nothing else but consciousness. Consciousness interferes with regulation of any processes occurring in the organism, but it prefers to play a safer game - it simulates cognitive activity of the underlying circuits, trying to arouse emotional (conscious) signals as the result of its work. Thus, the goal of this activity is not the adequate reflection or adaptation to the environment, but obtaining positive emotions. Consciousness tries to guess, what kind of conception about the world would arouse such an emotional response. Ergo, it begins to construct the environment in itself; furthermore, consciousness is ready to change the world in order to confirm its conceptions.

Making a decision is slower in consciousness than in other structures because it initially operates with the data which are obtained in these structures. Consciousness is selective because it does not worry about the accuracy or the completeness of the reflection — it works only with the information which allows positive emotions to arise and to avoid the negative ones. Consciousness should reflex its own work, or it will not be able to

improve. This is just an imitation, so it does not allow reaching the full intensity of the emotional experience, but forms weak, yet rather differentiated emotions. These emotions are the thoughts and experiences we are aware of. One of the main goals of consciousness is to generate these experiences all the time, to generate "the continuous consciousness flow" in William James's words. Of course, consciousness functioning in this way may lead us very far. There is nothing surprising in the fact, that a man can commit suicide or to go crazy when being confronted with reality, which does not correspond with the beauty of the world, constructed within the Consciousness. But nevertheless, the world constructed within consciousness relies on the real functioning cognitive structures rather firmly.

With the suggested approach we can formulate few experimentally grounded laws of the consciousness block functions: it attributes the accidental events the status of regular; it tries to avoid contradictions; it reacts to the unexpected information actively and stop to work with the expected one (it is just the essence of the consciousness flow: the consciousness content cannot be permanent, so the permanent information slip off consciousness quickly - ceases being perceived or becomes forgotten or transforms) and so on. The laws of aftereffect are found among the laws of consciousness functioning. Consciousness does not tend to verify the hypotheses which have been rejected once and prefers the hypotheses having been accepted for awareness before.

Consciousness is able to generate its own constructions, rather than elicit them from reality. But nonetheless these are the constructions describing the real but not the hallucinatory world. Even the World of Consciousness is not adequate to reality in full measure, but it is also not separated from the reality, and is adjusted with it. Otherwise it would be impossible to get such a long and intense emotional experience. It is due to the Consciousness that a man knows about the Big Bang, about dinosaurs and the conformism, guesses about the unverifiable (about God, determinacy of the world or the free will) and is able to think at all. If we had no consciousness a man could never get to know anything, because our knowledge is always the thing that we are aware of.

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