Perceptual psychology

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The way consciousness solves problems of learning and memorization[4]

It is not an organism but consciousness, that studies, remembers and learns to use the resources of the organism for solving the problems. Consciousness tries to guess the information that is kept in the organism's memory or the actions that an organism is able for and that are essential for the achievement of the required effect. It verifies its hypotheses in the experience, but simultaneously tries to protect them from the disproof.

Such conception has been illustrated by many experiments, in which three tendencies of subjects are proved: not to realize the thing that has once already been not realized; to repeat one's own mistakes, first of all, in the cases of increasing successfulness of the acts; to raise the effectiveness of memorizing and learning by complicating irrelevant components of task.

Keywords: *consciousness, learning, memorizing, memory, mistakes.*

All that a man knows about himself and the world he gets only with the help of consciousness. However, it is still not clear, how can consciousness help and what exactly it is doing in the process of cognition. That is why, the processes of learning and memorizing even in the psychological theory are mainly described as the physiological processes. For some reason, these wonderful theories tell us not about the phenomena of consciousness, but about quite automated processes of traces' engraving on one's memory or about the formation of hypothetical connection between some areas of the cerebrum.

This is the way all theories look, even when they are called cognitive. It cannot be doubted that physiologists discovered and brilliantly described many mechanisms for engraving something in the nervous system. But nobody said anything about the way consciousness would work with automatically memorized material.

At the same time, it is well known, that a human being learns and memorizes with the help of consciousness and that the advantage of voluntary (i.e. conscious) memorization over involuntary one is rightly underlined. Consciousness is mentioned in the theories of learning only incidentally without

any explanation of its task or the method it uses for solving the latter.

As a result, triumphantly walking on pages of textbooks stories about learning and memory conflict with each other, as well as with logic and experimental data [4]. The true mystique of the processes of learning and memory is simply missed.

There is no doubt about existence of the special physiological process of memorizing information. However, a person is not able to use something consciously as computer command "save" and type it in his memory. Many researchers (including I. Gerbart, G. Ebbinhaus, S.S. Korsakov, Z. Freud, A.N. Leontiev, Y.N. Sokolov, and others) assume, that in general, all incoming information is automatically preserved in memory (it is necessary to specify: in the physiological memory).

It is known, that man's memory keeps much more information, than it is capable to recall. And under certain conditions, this non-realized information could even become accessible to perception. Why a person cannot recollect what is obviously kept in its memory? What a work on learning the information that has been once remembered consists in? These questions even have not been seriously put in the theoretical structures. And as a result, more particular puzzles, which could be explained by any theory of memory, are not being solved as well.

How can a man recognize the signs, which he cannot reproduce? Why sometimes he reproduces something different from what he has been presented? Why he can suddenly start to worsen his results in the process of learning? How a subject manages to evaluate a degree of confidence of his answers' accuracy and to know exactly which of the answers is right?

Any well-known fact strikes imagination as an incredible one. Thus, everybody knows since childhood, that for correct reproduction of remembered text the text itself should be presented many times.

Theorists came to the profound conclusion: repetition is useful. Why? Frequent (and obviously nothing explaining) answer is: strength of the trace improves. But for memorizing, a man on each step should remember more, than he is capable to recollect, - otherwise all that he has not memorized earlier, in the following presentation would be perceived by him as *subjectively absolutely new information*. In this case, there cannot be any consecution of the connected acts in the process of memorization; any memorizing *activity* (including repetition) would be absolutely senseless. Therefore, the traces that a subject does not remember can be "substantially" kept in his memory as well.

The process of learning that most of the theorists relate to the process of memorizing is very queer. Here is a puzzle, which people usually try not to

notice: if a man is able to do what he is learning to do, then he does not need to learn it; and if he is not able to do it, then how can he manage to do what he obviously cannot do? This paradox is akin to the paradox of new knowledge retrieval known since the ancient world.

How does a man seek the new knowledge? - Amazed Greeks wondered. If he does not know himself what he is looking for then what does he seek? But if he knows, then, it is not the new knowledge. Learning is usually described so, that when a person many times repeats the same actions he gradually does it better and better. But how the result of the *repetition of the same actions* can raise the activity effectiveness?

No matter how often the same ineffective actions are repeated, they will still remain ineffective. And if the actions are not the same, there is no need to repeat them. This puzzle was clearly described by N.A.Bernstein, but he did not find its solution as he could not define precisely, what role consciousness plays in this process.

A man continues to improve the most simple acts even after hundreds of thousands and even after millions repetitions. But sometimes in the middle of the process of learning he gives such a quick answer that he cannot repeat it later. It means that he is *able* to react very quickly.

What does he learn then? And how a person, going from one awkward action to another during the process, knows if one awkward action is better than the other for "improving" this exact action not the other one? This is a pack of questions that have not a single distinct answer.

What does consciousness do in the tasks of learning and memorizing? The organism can be developed and improved; it becomes stronger, sturdier, and faster. But it is consciousness that studies, memorizes and learns to use already available opportunities of the organism for solving its problems, in particular, it learns to extract information from the physiological memory. The theorists shun the problems of consciousness but they can be understood.

Consciousness – is perhaps the most polysemantic term of many sciences. There is no definition of consciousness that is either unique or generally accepted. Thus, in *philosophy* consciousness as ideal is confronted with material, in *physiology* it usually indicates a level of wakefulness and is confronted with a dream, in *sociology* it stands for the rational regulator of behaviour - in contrast with spontaneous behaviour, in *linguistics* it is treated as the mental (psychic) state, expressible in word.

In psychology itself, consciousness is understood (regarded) in different ways as well. First of all, it stands for *an empirical phenomenon* of realization ("immediate potentiality") though it is recognized simultaneously that con-

sciousness somehow contains not fully realized information ("dark sensations", non-verbal purpose, indivisible background, etc.).

Consciousness is understood as a *theoretical term* designating "the highest form of reflection", "the integrator of psychic (mental) functions", etc. But no one knows what does it mean. For example, the greatest achievement of mystical asceticism - deliberate plunging in the state of "a devastation of consciousness" or "divine darkness of ignorance" - is it the highest or the lowest form of reflection?

One interprets consciousness as *something qualitative* (meaning "a gleam of consciousness"), the other one - as *something quantitative* (meaning "the range of consciousness").

Consciousness is regarded either as *a mechanism* in information processing or as *a process*, which is identified, for example, with short-term memory, attention or thinking and as the content of information received *as a result* (it pops up on "the screen of consciousness").

Such different and incompatible are the meanings that used to be imputed to consciousness, that there is not and cannot be anything corresponding with all given definitions at once. It turns out, that it is easier not to mention consciousness at all, than to entangle in contradictions. As a matter of fact, it is called behaviourism.

I would like to mention briefly and simplistically the experimentally confirmed view on the nature of consciousness that I have offered earlier [2,3]. It is supposed, that if we realize anything it is a result of functioning of a special brain mechanism (it can be named "mechanism of consciousness"), which forms hypotheses on outward things and organizes activity on controlling its experimental constructions on the basis of the information collected by the organism and in accordance with some detectable laws. Such artificially constructed world is named *"a subjective world"*.

The mechanism of consciousness behaves as if at the beginning it tries to guess the game rules, by which the nature "plays" with him, and then organizes the activity on checking up the surmises (hypotheses). Thereby, consciousness proceeds from the fact, that the nature operates by predetermined rules. In other words, everything is determined and interconnected in this world, all makes sense (in particular, such nature of consciousness inevitably leads to the appearance of unchecked assertions and mythology).

The tendency of consciousness to constructing surmises on the world's arrangement certainly can give a rise to the erroneous conceptions, but at the same time it allows to exceed the bounds of rather limited information about reality that a man receives from the organs of sense, and to create a notion of things that have no direct data.

It is known, that processing of the incoming information, its preservation in memory and automated actions are always executed better until the consciousness start to control them. It means, that the organism itself, like a physiological automatic machine, practically processes all incoming and earlier received information, as well as quickly and precisely fulfills any actions while consciousness does not interfere with its work.

Simultaneous forming of various hypotheses is neither creative nor realized act. It is completely automated process that mainly depends on gained experience and random selection. The special block of the mechanism of consciousness decides about what hypotheses should be realized, and what are beyond realization. (As a matter of fact, Z.Freud suggested such mechanism many years ago, but he has given it an unsuitable name – "censorship"). The work of this block cannot be realized (it is impossible to realize the process of realization!). Therefore, man is basically not capable to either control the sources of thoughts coming to consciousness or realize these sources. The given block selects from the received hypotheses those, which do not conflict with already created in consciousness idea of the world, and then the consciousness organizes their testing.

Consciousness decides which sensory information is possible and what movements are realizable in the subjective world created by it. Moreover, for checking these decisions it poses appropriate sensory and impellent problems for an organism. Faced with its own formations' mismatching with reality (reflected in the incoming sensory information as well as in the feedback of its own actions), the mechanism of consciousness first of all protects its own surmises from refutation ("smoothes over" generated cognitive discord over).

The matter is that it is unlikely for casual hypotheses to be correct. For not denying all hypotheses in general, an attempt to keep the chosen hypothesis should be made in the beginning. This can be accomplished by the regular correction of the experience towards the confirmation of earlier hypotheses, or by adjusting hypotheses to the experience, trying while it is possible to change marginally the existing idea of the world.

Here is the example that explains the above-mentioned theory. V.Y.Karpinskaya [8] in her dissertation research carried out under my direction, showed to the subjects a dual image - Nekker's cube. She has taught the subjects to consider a face of this cube to be "front" or "back" by instructions of the experimenter. Then she has measured the detection threshold of a point on the given face. With the face perceived as a back the threshold was higher, and with the face perceived as a front the threshold was lower.

It might seem startling, as in fact, all subjects saw *the same* flat picture. Psychologists assume, that we usually see (realize) only those things that we

understand and knowingly remember, things that agree with our expectations of the past, etc. Certainly, such activity of consciousness sometimes causes mistakes. But philosophers believe that for the avoidance of being deluded it is necessary to overstep the limits of the direct perception and to penetrate into the essence of the phenomenon.

The given point of view results in experimentally testable conclusions: the more unexpected are stimulus (it is necessary to bring them into line with expectations and hypotheses) the more time consciousness should spend working with them. It is experimentally proven fact. As for expected stimulus (permanent ones, in particular), they should quickly enough cease to be realized.

In fact, the images stabilized with regard to the retina, cease to be perceived in 1-3 seconds; repeated implementation of the actions of the same kind leads to their automation, i.e. to loss of the consciousness's control of them; successive repetition of a word several times leads to subjective sensation of the loss of meaning of this word, etc.

Therefore, there is no need to implement untestable assumptions of fragility or vulnerability of traces to explain forgetfulness.

The information, which has nothing to do with but is deliberately kept in immutable form, should cease to be realized even regardless of all efforts to keep it in consciousness as long as possible.

The human organism is ideally fit for cognition. Brain is the greatest computer surpassing in its opportunities all existing computer systems taken together. It accomplishes calculating, logic and semantic transformations of information of any complexity, even those that a human being cannot execute wittingly.

As a rule, results of these transformations are not realized by a person, though sometimes they are shown in the further activity (for example, in associations, subsequent choice, mistakes, etc.). Consciousness is a powerful mechanism of the cognition that is able to use opportunities of brain. It guesses what the world is, thinks about itself and the situation, checks these guesses and controls the necessary actions. Thus, the inseparable link of consciousness to activity, which has always been emphasized by domestic psychologists, is provided.

As the mechanism of cognition, consciousness should be capable to change its view on the world and sometimes to reject inadequate hypotheses. But consciousness possesses a powerful "protective belt", skillfully adjusts any experience to its hypotheses and accordingly is capable to interpret any arising discrepancy as an insignificant one.

How can consciousness reject its own constructions? All actually real-

ized notions (hypotheses) should be necessarily tested *independently*. It is possible, only if concurrently with the given hypothesis (and with the subjective world given to consciousness) there are other non-realized hypotheses (and non-realized subjective worlds) given to the mechanism of consciousness, which describe available information in a different way.

At the correspondence (even partial) between different hypotheses, consciousness gains a feeling of subjective confidence in the correctness of its formations. Sometimes it turns out, that due to made corrections, tested (and confirmable) hypothesis becomes so complicated that competing hypotheses owing to their simplicity start to win in the struggle for the right to describe the world. In this case, the latter "force out" the tested hypothesis from a zone of perception and take its place. Gestalt psychologists have given a special name to something similar - "over-structuring".

In the manner of stated position we can describe the processes of learning and memorizing. An organism rather successfully fulfills the problems posed for it byconsciousness using the information kept in memory and implementing certain actions when it understands what is required from it.

The organism does not solve problems of learning and memorizing, i.e. it does not fix once created traces and does not strengthen formed links. It is a rightful (though idealized) assumption that the organism even from one presentation keeps all the information in memory and in advance accomplishes the actions, which will be successfully carried out only at the end of the process of learning.

It is not the organism that learns and memorizes but consciousness, which learns to control the organism. The consciousness tries *to guess* information stored in memory or actions, which are necessary for achieving required effect, tests its hypotheses by means of experience persistently trying to protect its hypotheses from a refutation, i.e. protect its subjective world by adjusting it to reality in different ways.

 Checking hypotheses of what is stored in memory, what sensory information has been received or about results of its own actions, consciousness cannot directly evaluate how much the hypothesis conforms to the information stored in the organism. If there are no competing hypotheses, the result of organized check of its own hypotheses is certainly dependent on consciousness and then the principle of independent check of the hypotheses is violated [3].

Sometimes, mechanism of consciousness can directly use the phenomenal opportunities of the brain but then it can neither check its hypotheses nor control the correctness of use of these opportunities. Those who possess so-called phenomenal abilities (phenomenal memory, phenomenal

reckoning, etc.) do not know themselves, what exactly they do for the realization of these abilities.

Phenomenal reckoners and phenomenal mnemonics never doubt in achieved results because this process is not under their conscious control. Probably, the very *weakening* of both functions: of conscious control and generation of the hypotheses explains why such phenomenal occurrences often happen among mentally retarded, as well as in changed states, for example, in hypnosis or under strong stress.

Improvement of reproduction and more effective learning can be provided by solving others more complex tasks. The process of learning and memorizing can be more successful, if in view of the complexity of the main problem, consciousness forms the hypotheses only regarding this problem, while the direct reference to the information, which must be "memorized" in a control group or to motor commands that are required "to be learned" ceases to be controlled by consciousness and thereby becomes auxiliary only a process.

However, once having thought about accuracy of fulfillment of well-automated action (Have I closed the door? Have I turned off the iron?), the person henceforth will have to learn not to control these actions for a long time.

And now we shall briefly consider the results of the research that was carried out by me and my young colleagues for illustrating the stated ideas experimentally.

Stability of non-realized negative choice. In 1973 I have discovered and subsequently confirmed many times rather unexpected phenomenon (2; 26-95). If the subject successively solves several problems of the same type (on distinguishing, identification, memorizing, calculation, etc.) he tends to repeat his previous mistakes.

Thus, when the subject was offered to reproduce shown sets of symbols it turned out, that symbols missed in the previous set tend to be not reproduced repeatedly, if they are shown again. And, on the contrary, the same symbols more often than randomly are reproduced in the following set, where they are not shown. In that way, absence of reproduction is not the zero reproduction. In fact, for repeating a mistake (missing a symbol) it is necessary to remember, what exactly should not be reproduced.

Visual and aural presentation (presentation of visual and auditory images) of series of letters, syllables, pairs of "letter – number", double-digited numbers, chords (for musicians with perfect ear), names of playing cards, etc. proved that missed symbols had dual effect on their subsequent reproduction (i.e. the missed symbols are not reproduced, when it is required and on the

contrary, they are reproduced just when they should not be). My students showed the same phenomenon at reproduction and recognition of various materials (buttons of different size and colour, road signs, toys of the same kind, etc).

It should be mentioned, that when the effect was shown, it usually became apparent by *all subjects* and in *all positions* of a series. However, the very tendency to repeating non-reproduction of the shown symbols did not always become apparent. In some cases, it was even replaced by the opposite one. Such things could happen, when the subject's activity was diminished, for example in a state of slight alcoholic intoxication or when the subject was capable to reproduce more than 90 % or less than 40 % of shown symbols. The tendency could also change, when a missed symbol was placed into strongly differing place in the series or if words were used as a stimulative material.

 It is obvious, that any symbol placed into following series in quite different position subjectively ceases to be perceived as the very same symbol. Similarly, the given word presented in the list among other words changes in its turn its own semantic overtones and then does not act as subjectively same thing any more.

If the subject is shown a set of the same words in the same order (for example, in the form of grammatically and semantically meaningless quasi-sentences like "Days raging plough up again to elephants coming back pallor fire extinguishers") then at repeated presentation in several tests of the same set of words the tendency not to reproduce the previously non-reproduced words as well as to repeat the previous mistake of the replacement: for example, repeatedly mistake by reproducing "elephant" instead of "elephants" or "appearing" instead of "coming back".

On the grounds of above-mentioned tests the following conclusion was drawn: the non-reproduction is caused by specially taken decision on what is not necessary to reproduce. Then this decision is naturally repeated at the second collision with the same not reproduced before symbol.

The phenomenon of repeated non-realization may be observed at the solution of not only mnemonic problems, but sensory, motive, perceptual, arithmetic, semantic and other problems as well.

As an example, three inexperienced typists learned to type. I analyzed almost 16 thousand words that they had typed. On the average, word misprint probability is in six times less, than possibility that misprint will be made again in the same word. What was not perceived, calculated and understood once, tends to be not perceived, calculated and understood repeatedly.

Many other psychologists to their great astonishment observed similar

phenomena. One of them, A.P. Pahomov [14] in his psychophysical research registers the tendency to the repetition of the signal answer of the same intensity admitting though that he does not know how to explain it.

In fact, how does the subject know which answers to the given stimulus should be repeated if distinctions between signals are less than threshold? Having analyzed the time of reaction for shown words, V.A. Suzdaleva and N.I. Chuprikova made an assumption, that any thought process would be based not only on (realized) evaluation of the verbal stimulus, but on (not realized) evaluation of quite opposite thing [16; 121].

So there is a tendency towards repeating non-realization the thing that has been decided not to be realized once (non-realized negative choice). On the face of it, the result seems to be very strange. In fact, making a decision about non-realizing the very same stimulus, at first this stimulus must be remembered and then identified as the selfsame, and only after that a decision on repeated non-realization of it can be made.

A.Y. Agaphonov [1; 200], naming the given phenomenon "Allahverdov's effect", is at one with me in interpreting it: "non-realization is not the fact of forgetting, not cognitive error caused by the restrictions of the memory resources, but natural consequence of making "conscious" decision on what is necessary to reproduce".

As it proved, the more strained the attempts to realize directly what has not been earlier realized, the less are they effective. However, as it has been mentioned, negatively chosen results of the cognitive activity nevertheless can reach consciousness; not at the moment of special conscious efforts but following it – *at inappropriate moment or while changing the current task.*

It is well known to everyone, who ever tried to recollect something that he knew and failed to take the necessary information into his head. In that case, recollection usually occurs not when you tensely try to remember it but when you have already turned your attention to another activity. In fact, it is a change of the current task as well!

In the same way, we are usually taught to check on addition of a digit group not by repeating the same procedure of calculation (so if the first time numerals were added up in columns from the top, then when checking it is better for example to add them up from below).

Wise mathematics teachers know, that otherwise a mistake probably will be repeated though it obviously has not been realized. Consequently, one of the phases of creativity - incubation, which is often described by researchers as the most mysterious and incomprehensible, is a standard method of any cognitive activity, which requires switching of consciousness from one activity to another for realizing solution that has not been realized before. Be-

sides, this method is in common practice in psychology in cases when the client needs to realize the ideas that are escaping his consciousness.

As the second image of dual picture can not be persistently realized at the same perceptual task, but is reflected in associations or reminiscences of the subject, as the psychologist can provoke the subject into realizing what has not been realized before by means of associations, reminiscences, etc.

Steadiness of checked by consciousness hypotheses in learning and memorizing is empirically shown in the form of solid error. In A.S. Zajtsev's research [16], 20 matrixes (5x5) with only one image of geometrical figure in each cell - a triangle or a square of white or black colour, were sequentially shown to the subjects on computer screen. The subjects' task was to mark, in what cell of matrix, in what order and what figure had been shown in the given position.

Experiment continued till the first correct reproduction of all stimuli. During the testing, the correctness of the answer (order of stimulus in the series, position of the figure on matrix, type and color of the figure), level of confidence (confident - not quite confident - not confident) and the time that input of the answer took have been recorded. The 70 % of subjects demonstrated the presence of a plateau, i.e. two consecutive tests with identical number of correctly reproduced stimuli. The 85% of subjects showed the cases of recession - diminution of number of correctly reproduced stimulus. (I wonder if admirers of the theory of trace strengthening can explain, what does it mean?)

The solid errors were defined by erroneous coincidence of three parameters in the previous and the subsequent tests: figure position on the matrix, type and color of the figure.

Thus, we are coming to conclusion that, the right answers are the fastest, but nevertheless, solid erroneous answers are significantly faster than other erroneous answers. This tendency is maintained at all phases of confidence. The subject in general, is more confident of his answer in making a solid error rather than other one. There are less solid errors (among all errors) in cases of recession, and at the same points, solid errors take much more time than any other errors.

It can be assumed that, riddance of some solid errors and expansion of time for the remained solid errors occurs at the recession because just in these moments the change of hypothesis happens.

A.B. Lihacheva [10] showed to the subjects for learning a succession of twelve pictures constructed as four concentric circumferences with red or green circle inside (on the left or on the right, above or below). In the sixth test, the four of presented pictures (second, fifth, seventh and eleventh) were

changed and then the experimenter came back to the initial stimulating series. Though in the control group no changes were made. The quantity of the tests necessary for learning was not significantly distinguished between the experimental and the control group. But in the experimental group the quantity of errors in general and solid errors in particular has sharply decreased. The quantity of tests necessary for learning has increased in the group, where the change has been kept in all subsequent presentations.

N.A. Ivanova [7] in her research proved, that at the time of learning the subjects' repeatability accuracy of errors at the very beginning of process could exceed adequacy of problem solution, which is hardly reached by them at the very end. The subjects were given a simple task: to "shoot" at the target moving horizontally from the left to the right on the top of the screen using the device located at the bottom of display. The subject watched the flight of a shell, then set the shell in motion by pressing the button and observed the presence or absence of contact between the shell and the target. The shell was put in random order in eight different and closely set positions.

The subjects did not always distinguish the shell positions and all the more did not they notice, how many of such positions were used. After a shot, the shell's actual deflection (in pixels) from the center of target popped up on the screen. Each subject carried out a series of tests during 15 days successively, making 200 shots. At the end of the test they demonstrated an average deflection within 5 - 10 pixels.

However, it turned out that the subject, having deviated at any value (in pixels) to the right or to the left from the center of the target, was inclined to repeat the following *definitely the same* deflection by shooting from the old position not from a different one. He repeated mistakes to the high degree of accuracy that was surpassing his own abilities, not always distinguishing the positions of the shell.

The complicating of the irrelevant components of the task facilitates the processes of learning and memorizing. The components that do not require reproduction (and even comprehension) are irrelevant.

It is well known, that mnemonic receptions are efficient, but they set tasks (formation of associations, arrangement in space, etc.), which are just irrelevant complication of memorization task. The activity of consciousness mechanism of memorization is irrelevantly *complicated* by the meanings and the regularities of the stimulatory material. Consequently, the meaning-bearing text is easier to remember. Standard theories do not provide a clear explanation for the effect of complication, which as a matter of fact, has even got the special name – "effect of generation".

It was discovered, that such effects are shown even in the case of unin-

tentional complication of the task. In M.O. Olekhnovitch's research [13] the subjects were shown 30 sentences, 20 of which were conflicting while the other 10 were neutral. In the first series, one word was missed in every sentence. The subjects were invited to add the word, which, in their opinion, matched the context.

In the second series, already two words were missed, including the previous one. The subjects were invited to recollect both words and to complete the sentence. After a small and abstractive task, the subjects worked with the sentences for the last time. This time, three words were missing in the sentences, including two previous, with no contradictions in the text. After the abstractive task, the subjects were invited to reproduce all the sentences as precisely as possible.

It turned out, that the consciousness was more active with the contradictory sentences, which are reproduced with distortions almost five times more often than neutral ones. The sentences with the realized contradictions are easier recollected than all the others. Even the sentences with contradictions that had not been realized by the subjects were recollected easier than the neutral phrases.

V.A. Gershkovitch [6] carried out the research with the framework of directed forgetting's paradigm with some modifications. The subjects were shown 30 syllables on the computer display and each of them was followed by a sign signaling if the shown syllable should be remembered or not. The subjects had to memorize 15 nonsensical syllables till the first correct recognition. In an hour, there was the second series, in which the subjects had to memorize the rest 15 syllables, which were not to be remembered in the first series.

The control group also took part in the experiment by memorizing only 15 syllables. The number of the attempts necessary for memorization of the given syllables in both the first and the second series was smaller than the control group required for learning the same quantity of syllables. In other words, not only those syllables, which were offered to memorize, but also those, which should not be memorized, were kept in the memory. Besides, complication of a task by inserting irrelevant (not being a subject to memorization) syllables facilitated the memorization.

N.V. Moroshkina [12] showed the subjects a number pair (from 1 to 9) on the computer screen. The task was - to add up the first number pair and press the key corresponding to received output, to subtract the second number pair and further alternate addition with subtraction consecutively.

The task was to be fulfilled at the maximum speed. There were only 16 possible variants of the given pairs (pairs that had zero, negative or double-

figure output had been excluded). In the experimental group these 16 pairs were shown 14 times successively in the strict and equal consecution, what the subjects were neither aware of nor guessing about even at completion of the experiment. Then, one of the number pairs was rearranged so that continuing the fulfillment of the given task, the subject was compelled to carry out the backward operation with the same number pairs (what had been added was to be subtract and vice versa). In the new sequence, each series has been shown four times (critical series).

To the subjects of the control group the number pairs were shown in random order. The task of addition and subtraction of simple quantity numerals is elementary. However, the subjects' solutions sometimes were far from quick and error-free. Time given for the exercise was fluctuating from 0,4 - 0,6 to 5,0 - 7,0 seconds.

Just think it over: in fact, there must be something that makes adult and well-educated subjects to tackle an example like: 7+1 and what is more, to make mistakes! (Is it possible, that some connections of their brains had not been strengthened enough?) The complications - not realized regularity – result in faster learning in the experimental group. The reduction of time of the answer (compared with the control group) was observed as early as in the second presentation of the same number pair, in the sixth presentation the distinction has got a statistical significance.

In the critical series (at the sign change during operation with figures) the time all subjects spent on giving an answer increased sharply and sometimes even exceeded the start level. In that way, the stability of the chosen hypothesis was shown.

M.V. Terehovitch [15] used the stimulant material, which was analogous to the matrixes in A.S. Zajtsev's research. But besides flat matrixes (3x4, 4x4 and 4x5), she showed to subjects the similar, but graphically performed as the cubes, matrixes. The subject had to memorize in what cells of a matrix the dot was. It was proved, that memorization of 10 dots position in stereoscopic pictures required essentially fewer reiterations, than memorization of the same 10 dots on the plane.

P.F. Pahomov [14] in his research showed the subjects 10 double-digited numbers for memorizing. In the first group all shown number images were of the same size; in the second group - the sizes of images were regularly interchanged (small – big); in the third group – the interchange became more complicated (small - small – big); in the fourth group – the interchange of the image size was absolutely random. In the second and third groups memorization went too much faster. At that, equal series and series with chaotic interchange of the size have been memorized equally.

The complication of irrelevant components is not permanent. Y.A.Ledovaya [9] showed to subjects for memorization 12 five-unit numbers, divided by two hyphens like a telephone number, for example, 25-17-3 or 2-51-73. Participants of the experiment did not have to memorize and reproduce hyphens. In four out of twelve numbers, the configuration of hyphens was permanent in each presentation of stimulus. In another four configurations - hyphens could have four variants of their position between the figures. The remained four numbers were shown with two variants of the figures' division by hyphens. And the very last numbers were reproduced in 8 (!) presentations earlier, than the others.

Consequently, it is better to remember the same thing in different ways (for example, the color spectrum: red, orange, yellow, green, etc. - is better and easier to remember by correlating it with something familiar). And for remembering the telephone numbers it is better to make different notes of it (for example, 653-35-93 and 65-33-593).

The described experimental phenomena partly demonstrate the way the mechanism of consciousness is acting. This mechanism forms hypotheses (surmises) of the information that is kept in the physiological memory (memorizing task) or of ways of operating with this information (learning task). It does not simply check the made surmise by comparing it with immediate stored information or with motive commands, but makes up other surmises, which are not realized by it in the given period.

Comparison of surmises (hypotheses) allows both to become firmly convinced of subjective fidelity of one's own actions and to deny an unsuccessful hypothesis. Insertion of irrelevant components in the shown information allows to modify the hypotheses owing to a wide variety of different material and thereby, heightens the probability of formation of the hypotheses, which are different, but still have an information structure relevant to the posed problem.

However, the overabundance of irrelevant components apparently starts to impede either the choice of hypotheses for the collation or the process of collation itself. The mechanism of consciousness aims to corroborate its own hypotheses and therefore it is inclined to repeat its solutions on realization and non-realization of one or another information.

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